NetSure™ Control Unit (NCU)

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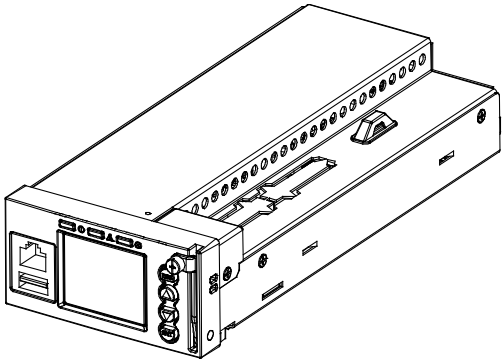
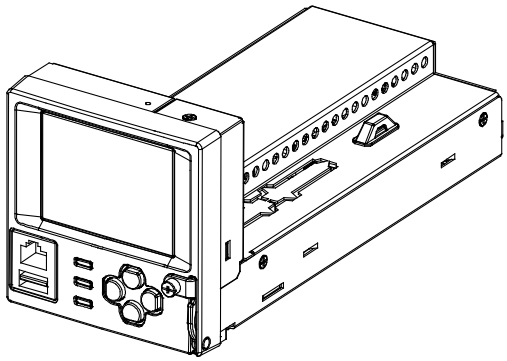


Model M830B



Model M830D

EMERSON
Network Power

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Table of Contents

Admonishments Used in this Document vii
Introduction 1
Preface 1
Overview 1
Function Descriptions 2
Rectifier, Solar Converter, and Converter Control 2
System Components Monitoring and System Alarms Generation 2
Operating Data Acquisition and Data Logs 2
Battery Management 2
Battery Charge Temperature Compensation 3
Battery Equalize Charge and Battery Charge Current Limit 3
High and Low Battery Temperature Alarms 4
Battery Thermal Runaway Management (BTRM) Feature 4
Battery Discharge Test and Battery Test Logs 4
Battery LVD (Low Voltage Disconnect) 5
Battery Capacity Prediction 5
Battery Block and Battery Midpoint Monitoring 5
Enhanced Battery Monitoring with SM-BRC 5
Thermal Runaway Detection and Management 5
Energy Management 6
Energy Optimization Mode 6
Power Split Feature 6
Diesel Management Feature 7
Supervisory Module (SM Modules) Monitoring 7
Hybrid Control Function (Supporting Generator, Solar and Wind Energy Input, and Optimization) 7
General 7
Hybrid Operation 7
Early Termination of the Discharge Periods 8
Operation with Grid Power 8
Relay Assignment – when in Hybrid Mode 9
Fixed Daily 9
Capacity Discharge 9
Maximum Current Limit Function 9
Communications Function 10
Operation 12
Local Indicators 12
Passwords and Privilege Levels 13
Multiple Languages Supported 13
Using the Local Keypad and Display 14
Local Menu Navigation Keys and LCD Display 14

Local Display Menus 14
Navigating the Menus 14
Using the Web Interface 15
Overview 15
Multiple Browsers Supported 15
Web Interface Screens 15
Procedures 15
Setting IP Communications Parameters (if controller not set as DHCP) 15
Setting for DHCP 15
Connecting the Controller to your Local Area Network (LAN) 15
Connecting the Controller Directly to your Computer 15
Disabling Proxy Server Settings to Enable a Connection to the Controller over an Intranet Network (if required) 16
Internet Security Settings for Loading Files or Downloading Files into the NCU 17
Logging into the Controller 19
Common Tasks Performed via the Local Keypad and/or Web Interface 19
Procedures 19
Start Wizard 19
Viewing Alarms 19
Viewing System Status 19
Viewing the NCU Controller's Device Inventory 19
Clearing or Resetting Alarms 20
Clearing Logs 20
Disabling the Local Keypad Sound 20
Blocking Alarms 20
Changing the Date 20
Changing the Time 20
Adding, Deleting, and Modifying Users 20
Setting IP Communications Parameters (if controller not set as DHCP) 20
Setting for DHCP 20
Setting SNMP Parameters 21
Setting Auto Equalize 21
Programming the Audible Alarm Feature 21
Manually Forcing LVDs 21
Manually Forcing Relays 21
Assigning Severity Level to Alarms 22
Assigning Relays to Alarms 22
Placing the System in Float or Equalize Charge Mode 22
Viewing/Changing the Float Voltage Setting 22
Viewing/Changing the Equalize Voltage Setting 22
Setting Battery Parameters 22
Setting Battery Capacity Parameters 22

Setting Rectifier High Voltage Shutdown 22
Setting Rectifier Current Limit 22
Setting Over Voltage Alarm 1 22
Setting Over Voltage Alarm 2 22
Setting Under Voltage Alarm 1 23
Setting Under Voltage Alarm 2 23
Setting Temperature Sensors 23
Setting Battery Charge Temperature Compensation 23
Setting Battery Thermal Runaway Management (BTRM) Feature 24
Configuring the NCU Identification of Rectifiers and Assigning which Input Feed is Connected to the Rectifiers 24
Configuring the NCU Identification of Converters 24
Setting Digital Inputs 24
Setting Battery Block and Battery Midpoint Monitoring (if equipped with an EIB Assembly) 24
Setting External Shunts (connected to the EIB Assembly) 25
Setting External Shunts (connected to the SM-DU+ Assembly) 25
Setting the System Current Alarm 25
Using the Relay Test Feature 25
Clearing the Maintenance Alarm 26
Performing a Manual Battery Discharge Test 26
Updating the NCU Controller's Device Inventory 26
Backing Up the NCU Configuration 26
Reloading a Backed-Up NCU Configuration 27
Upgrading the NCU Using an Application ("All") Package 27
Restoring Factory Default Configuration 28
Rebooting the Controller 28
Power Split Feature 28
Overview 28
How Power Split Works 28
Operating Modes 29
Requirements and Conditions 29
Paralleling the Existing and NCU Power Systems 30
Programming the NCU Power Split Feature 31
Verifying the Operation of the Power Split Feature 32
Resolving Alarms 33
Local Display Menus 67
Overview 67
Menus 67
Factory Default Setpoints 67
Adjustment Range Restrictions 67
Main Menu 69
Controller Information Menu (accessed from the Main Menu) 70

Alarm Menu 71
Settings Menu 72
Start Wizard Sub-Menu (accessed from Settings Menu) 77
Input Power Menu 78
Module Menu 79
DC Menu 80
Battery Menu 81
Description of Local Display Menus Programmable Parameters 82
Settings Menu 82
Maintenance Sub-Menu 82
Energy Saving Sub-Menu 82
Alarm Settings Sub-Menu 82
Rect Settings Sub-Menu 82
Batt Settings Sub-Menu 83
Basic Settings Sub-Menu 83
Charge Sub-Menu 83
Battery Test Sub-Menu 83
Temp Comp Sub-Menu 83
Batt1 Settings Sub-Menu 84
Batt2 Settings Sub-Menu 84
LVD Settings Sub-Menu 84
AC Settings Sub-Menu 84
Sys Settings Sub-Menu 85
Comm Settings Sub-Menu 85
Other Settings Sub-Menu 85
Web Interface Screens 88
Overview of Web Function 88
Homepage 88
System Status Information Area 89
System Specifications Information Area 89
Controller Specifications Information Area 89
Alarms Area 90
System Status Area 91
Power System Tab 91
Device Group Status Pages 92
General Status Tab 100
Menu Navigation Area 101
Settings Menu 101
Changing Programmable Parameters in the Settings Menu 103
Quick Settings Tab Programmable Parameter Descriptions 103
System Tab Programmable Parameter Descriptions 104

Battery Tab Programmable Parameter Descriptions 109
ECO Tab Programmable Parameter Descriptions 112
LVD Tab Programmable Parameter Descriptions 112
Temp Probes Tab Programmable Parameter Descriptions 113
Rectifiers Tab Programmable Parameter Descriptions 114
DC/DC Converters Tab Programmable Parameter Descriptions 115
Solar Tab Programmable Parameter Descriptions 116
Battery Test Tab Programmable Parameter Descriptions 116
Time Settings Tab Programmable Parameter Descriptions 117
History Log Menu 118
Alarm History Log Tab 118
Battery Test Log Tab 120
Event Log Tab 121
Data History Log Tab 123
System Log Tab 125
System Inventory Menu 127
Advanced Settings Menu 128
Ethernet Tab 128
Users Tab 129
SNMP Tab 131
Language Tab 134
SW Maintenance Tab 135
Alarms Tab 140
DI Alarms Tabs 141
Alarm Report Tab 143
Generator Tab 144
Shunt Tab 146
Power Split Tab 147
Monitor Protocol Tab 149
Clear Data Tab 151
Accessing the Controller via a Network Management System (NMS) 152
General 152
NMS Supported by SNMP Agent 152
NMS Supported by SNMP v2 152
NMS Supported by SNMP v3 152
Parameter Setting in SNMP Manager 153
MIB Installation 153
Installation 153
Contents of the Controller's MIB 153
Accessing the Controller through an NMS 156
Apply Administrative Privilege 156

Add NMS through Web Browser 156
ESR Configure 156
Replacement Procedures 157
NCU Replacement 157
Specifications 158

Admonishments Used in this Document

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	WARNING! Warns of a potential hazard the reader ***may*** be exposed to that ***could*** result in death or serious injury if not avoided. This admonition is not used for situations that pose a risk only to equipment, software, data, or service. (ANSI)
	CAUTION! Warns of a potential hazard the reader ***may*** be exposed to that ***could*** result in minor or moderate injury if not avoided. (ANSI, OSHA) This admonition is not used for situations that pose a risk only to equipment, data, or service, even if such use appears to be permitted in some of the applicable standards. (OSHA)
	ALERT! Alerts the reader to an action that ***must be avoided*** in order to protect equipment, software, data, or service. (ISO)
	ALERT! Alerts the reader to an action that ***must be performed*** in order to prevent equipment damage, software corruption, data loss, or service interruption. (ISO)
	FIRE SAFETY! Informs the reader of fire safety information, reminders, precautions, or policies, or of the locations of fire-fighting and fire-safety equipment. (ISO)
	SAFETY! Informs the reader of general safety information, reminders, precautions, or policies not related to a particular source of hazard or to fire safety. (ISO, ANSI, OSHA)

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Introduction

Preface

These instructions describe the complete functionality of the NetSure™ Control Unit (NCU). Some functionality is dependent on hardware connected to the NCU. Your system may not utilize all the functionality described.

Refer also to the NCU Configuration Drawing (C-drawing) furnished with your system for a list of factory default settings.

Overview

The NCU performs the following functions:

- Rectifier Control, including an Energy Optimization Mode
- Solar Converter and Converter Control
- System Components Monitoring and System Alarms Generation (including recording alarms in logs)
- Operating Data Acquisition and Data Logs
- Battery Management
- Energy Management via Energy Optimization Mode
- Power Split Feature
- Diesel Management Feature
- Supervisory Module (SM Modules) Monitoring
- Hybrid Control Function (Supporting Generator, Solar and Wind Energy Input, and Optimization).
- Maximum Current Limit Function
- Communications Function

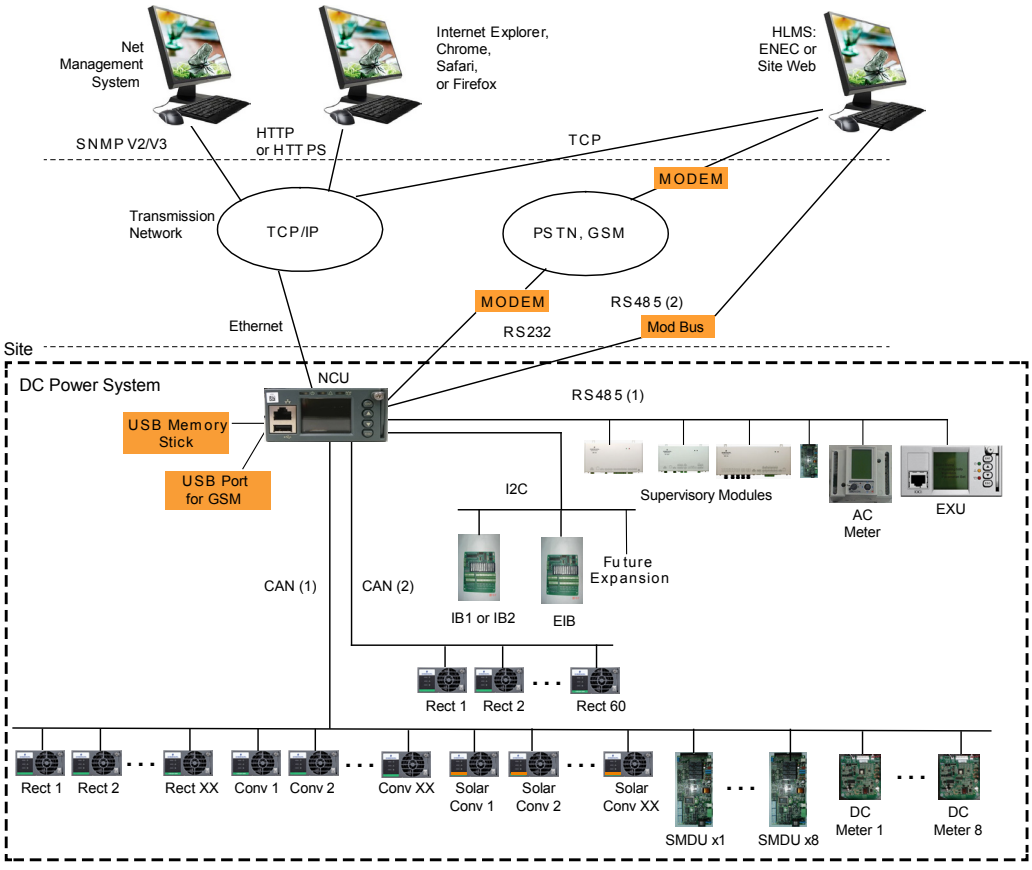
The NCU controls the system automatically via configured parameters.

A User can interface with the NCU locally using the local keypad and LCD display or locally/remotely using the Web Interface.

The NCU can also be accessed via SNMP (v2 and v3).

Figure 1 illustrates the various applications that can be used to interface with the NCU.

Figure 1. Interfacing with the NCU



Function Descriptions

RECTIFIER, SOLAR CONVERTER, AND CONVERTER CONTROL

The NCU controls rectifiers, solar converters, and converters automatically.

SYSTEM COMPONENTS MONITORING AND SYSTEM ALARMS GENERATION

The NCU monitors the components comprising the system (such as the rectifiers, solar converters, converters, and supervisory modules) and generates alarms if a fault condition occurs. The NCU also maintains an alarm history log.

The available system alarms are programmed with an Alarm Severity Level. Each Alarm Severity Level has different visual/audible alarm attributes. Available Alarm Severity Levels and their attributes are listed in Table 1.

Table 1. Alarm Severity Levels

Alarm Severity Levels	Red LED	Yellow LED	Audible Alarm Buzzer
Critical Alarm (CR)	ON	--	ON
Major Alarm (MJ)	ON	--	ON
Minor Alarm (MN)	OFF	ON	OFF
No Alarm (NA)	OFF	OFF	OFF

- **Alarm Status Setting:** Indicates if the alarm is active or not active, and the severity level if active. The available alarm status settings are as follows.
  - **Critical Alarm:** The fault endangers the power systems continued function.
  - **Major Alarm:** The fault reduces the power systems functionality.
  - **Minor Alarm:** Special operating condition.
  - **No Alarm:** The alarm is disabled and no alarm is given.
- The alarm indicator turns OFF if the fault(s) that triggered the alarm clears.
- The audible alarm can be silenced by pressing any key on the NCU local interface pad. The audible alarm is also silenced if the fault(s) that triggered the alarm clears.
- An audible alarm cutoff feature can be programmed that silences the audible alarm after a preset programmable time period. The audible alarm can also be disabled.

The available system alarms can also be mapped to alarm relays (located on controller interface boards) that can be wired to external alarm circuits.

OPERATING DATA ACQUISITION AND DATA LOGS

The NCU acquires and analyses real time data from the system's components such as the rectifiers, converters, and supervisory modules.

The NCU uses this data to process alarms and also records data in logs. The logs are viewed using the Web Interface and consists of the following. Logs can be saved in the .html (Web page) or .txt (text) format.

- **Alarm History Log:** Records 4000 latest alarms. The Web Interface displays the latest 500 items.
- **Battery Test Log:** Up to ten (10) battery discharge tests can be recorded.
- **Event Log:** Records 500 latest events.
- **Data History Log:** Records 60000 latest history data. The Web Interface displays the latest 500 items.
- **System Log:** Records 3000 items in run log. The Web Interface displays the latest 500 items.

Note: *Once maximum number of log entries is reached, new entries overwrite the oldest entries.*

BATTERY MANAGEMENT

The NCU provides the following battery management functions.

- Battery Charge Temperature Compensation
- Battery Equalize Charge
- Battery Charge Current Limit
- High and Low Battery Temperature Alarms
- Battery Thermal Runaway Management (BTRM) Feature (Reduces Voltage during a High Battery Temperature Condition)
- Battery Discharge Test
- Battery Test Logs (ten [10] logs saved)
- Battery LVD (Low Voltage Disconnect)
- Battery Capacity Prediction
- Battery Block and Battery Midpoint Monitoring

- Enhanced Battery Monitoring with SM-BRC
- Thermal Runway Detection and Management

Battery Charge Temperature Compensation

The NCU can be programmed to automatically increase or decrease system output voltage to maintain battery float current as battery temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained. Temperature is monitored by a sensor mounted on the battery. See your power system documentation for temperature sensor information. You can also set high and low compensation temperature alarms.

Functional Description (See Figure 2):

Battery charge temperature compensation adds a correction term, related to the temperature of the batteries, to the nominal value of the system voltage. The degree of regulation (TempComp Coeff), expressed in mV/°C/battery string, can be set per battery manufacturer recommendations.

To protect batteries and voltage-sensitive loads, compensation is automatically limited to a maximum of two volts (48V systems) or one volt (24 volt systems) above or below the nominal output level (float setting). Temperature compensation can be set to clamp lower than this by enabling the Temperature Compensation Clamp feature. When enabled, temperature compensation will clamp if the battery temperature reaches either the Temp Comp Max Voltage setting or the Temp Comp Min Voltage setting.

Temperature compensation is automatically disabled if communication between the controller and all rectifiers is lost, a DC over or under voltage alarm activates, a low voltage disconnection occurs, manual mode is entered, or the system enters the equalize or test modes.

Battery Equalize Charge and Battery Charge Current Limit

The NCU can increase system output voltage for equalizing the charge on all battery cells of a conventional flooded cell battery, or for recharging the battery following a commercial power failure.

The charging function can be initiated cyclically (scheduled), automatically, or manually.

Refer to the battery manufacturer's instructions for equalize charging instructions.

Functional Description (See Figure 3):

- **Start of Charging:** When the battery charge current exceeds a preset value for three (3) minutes or if the calculated battery capacity has decreased to a preset value (after a commercial AC failure, for example), the charging function of the NCU is activated. A charging signal is sent from the NCU to the rectifiers to increase the voltage up to the battery charging level Vequalize.
- **Battery Current Limitation:** After a commercial AC failure or when some battery cells are permanently damaged, the current to the batteries can be quite extensive. To avoid overheating or further damages to the battery, the NCU limits the battery current to a preset level by limiting the charging voltage of the rectifiers. Should the battery current still exceed a higher preset value, an alarm is issued.
- **End of Charging:** When the charging current drops below a preset value, a defined prolonged charging time is started before the charging is stopped and the voltage of the rectifiers return to the float charging level (Vnom). For safety, there is an equalized charging limit time that stops the charging after a preset time.

Figure 2. Temperature Compensated Voltage Control

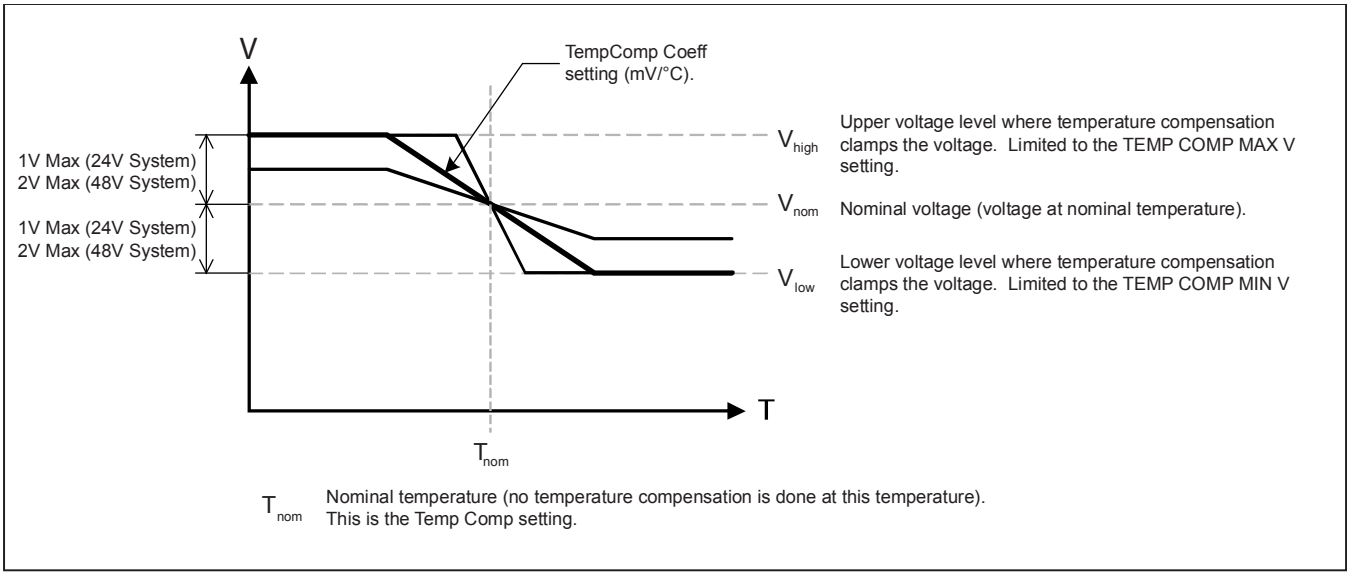
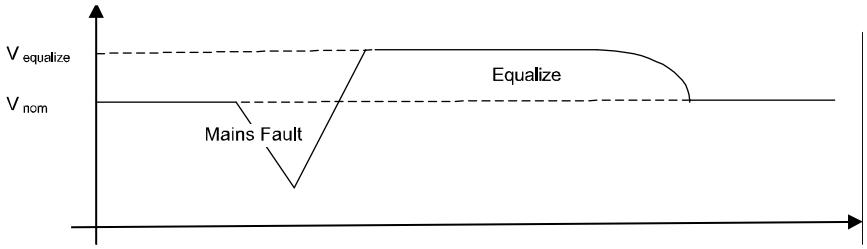

V
TempComp Coeff setting (mV/°C).
1V Max (24V System)
2V Max (48V System)
1V Max (24V System)
2V Max (48V System)
V high
Upper voltage level where temperature compensation clamps the voltage. Limited to the TEMP COMP MAX V setting.
V nom
Nominal voltage (voltage at nominal temperature).
V low
Lower voltage level where temperature compensation clamps the voltage. Limited to the TEMP COMP MIN V setting.
T
T nom
T nom
Nominal temperature (no temperature compensation is done at this temperature). This is the Temp Comp setting.

Figure 3. Voltage Characteristics on Commercial AC Failure and Automatic Equalize Charging



High and Low Battery Temperature Alarms

The NCU can monitor battery temperature via a temperature sensor mounted on a battery cell. Values for high battery temperature and low battery temperature alarms can then be programmed into the NCU.

Battery Thermal Runaway Management (BTRM) Feature

The Battery Thermal Runaway Management (BTRM) feature reduces voltage during a high battery temperature condition.

You can designate a temperature sensor as the BTRM sensor. The BTRM sensor has High 2 and High 1 BTRM temperature alarm limits. If battery temperature exceeds the "BTRM Temp High 2" setting, system voltage is lowered to the BTRM voltage setting. This feature can also be disabled.

Battery Discharge Test and Battery Test Logs

The NCU can perform battery discharge tests to check the condition of the battery(s). There are three (3) types of battery discharge tests:

- Battery Test without Constant Current
- Battery Test with Constant Current
- Short Time Test (requires two battery shunts)

A User can manually start a battery discharge test or program the NCU to automatically start battery discharge tests at scheduled intervals. Twelve (12) Constant Current Tests can be scheduled by the month-day-year. A Short Time Test can be scheduled to be performed every 1-365 days. During a battery discharge test, the NCU controls the rectifiers output to place the entire load or partial load on the batteries. The NCU monitors the discharge of the

battery and saves the results in a battery test log. The NCU stores ten (10) battery discharge tests.

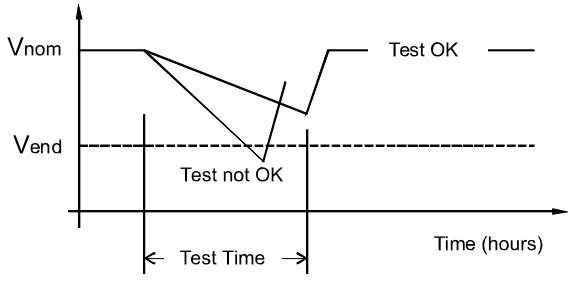
Functional Description:

For manual battery discharge tests as well as for scheduled battery discharge tests, the following parameters must be set: End Test Voltage, End Test Time, and End Test Capacity. See Figure 4.

Battery Discharge Test Sequence:

- For a Constant Current Test, the output voltage of the rectifiers is reduced so that the batteries supply the preset Constant Current Test Current to the load.
- If Constant Current is disabled, then the current being delivered by the batteries will be dependent on the load.
- For a Short Time Test, the output voltage of the rectifiers is reduced so that only the batteries power the load. If the batteries fail, the rectifiers power the load.
- The battery test continues until one of the following occurs:
  a. The preset End Test Time, see Figure 4, expires. The battery has passed the test.
  b. The battery voltage drops below the preset End Test Voltage (Vend) (see Figure 4). The battery has not passed the test and the test is interrupted. A bad battery alarm is activated.
  c. The battery capacity drops below the preset End Test Capacity. The battery has not passed the test and the test is interrupted. A bad battery alarm is activated.
- A battery test alarm is active during a battery discharge test.
- If the battery has not passed the test, a bad battery alarm is activated.
- After the battery discharge test, the output voltage of the rectifiers increases so that the rectifiers supply the system and charge the batteries.

Figure 4. Battery Test Diagram



Battery LVD (Low Voltage Disconnect)

To prevent serious damage to the batteries during a commercial AC power failure, the batteries can be disconnected by voltage or time control.

The batteries are reconnected automatically when commercial AC power is restored and a predetermined DC voltage level is reached.

- Voltage Controlled Disconnection: When the set voltage level is reached, the batteries are disconnected.
- Time Controlled Disconnection: After the Mains Failure alarm occurs the batteries will disconnect after the set time has elapsed.

Battery Capacity Prediction

The NCU can predict battery capacity.

Battery Block and Battery Midpoint Monitoring

The NCU can monitor battery blocks (12 V blocks) or midpoint battery voltage of battery strings connected to the EIB (Controller Extended Interface Board) assembly. An alarm is issued when either battery block voltage or battery midpoint voltage is abnormal.

Enhanced Battery Monitoring with SM-BRC

When connected to an SM-BRC, the NCU provides enhanced battery monitoring.

Thermal Runaway Detection and Management

Functional Description:

The system uses several control mechanisms to avoid thermal runaway.

- During a short high rate discharge, the batteries will normally get hot. The NCU takes this into consideration. After completion of the discharge duty, the batteries are recharged with a limited current to avoid heating the batteries any further.
- The temperature of the batteries can be monitored, and the NCU sets the charge voltage appropriately, as previously described under “Battery Charge Temperature Compensation” on page 3.
- In addition to battery temperature compensation, if battery temperature rises above a set temperature limit, the system stops battery charging completely by lowering the output voltage to the “BTRM Voltage” setting. This allows the batteries to cool down. The system also provides alarm notification of this

occurrence. Power supplied to customer equipment is not interrupted.

- The battery LVD circuits can be programmed to open (disconnect) if a high temperature event occurs (HTD-High Temperature Disconnect). The contactor(s) open when battery temperature rises above a programmable value and close again when battery temperature falls below another programmable value.

ENERGY MANAGEMENT

Energy Management consists of an Energy Optimization Mode.

Energy Optimization Mode

The NCU provides an Energy Optimization Mode function. Energy Optimization permits an installation to only operate rectifiers as needed to maintain the load and keep batteries in a fully charged condition. As load increases, Energy Optimization turns on additional rectifiers as needed to maintain the load. As load decreases, Energy Optimization places rectifiers in standby to conserve energy usage. Rectifiers which are always operating to maintain any load requirements are cycled through the group of rectifiers controlled by this feature to provide uniform operating times for each rectifier.

POWER SPLIT FEATURE

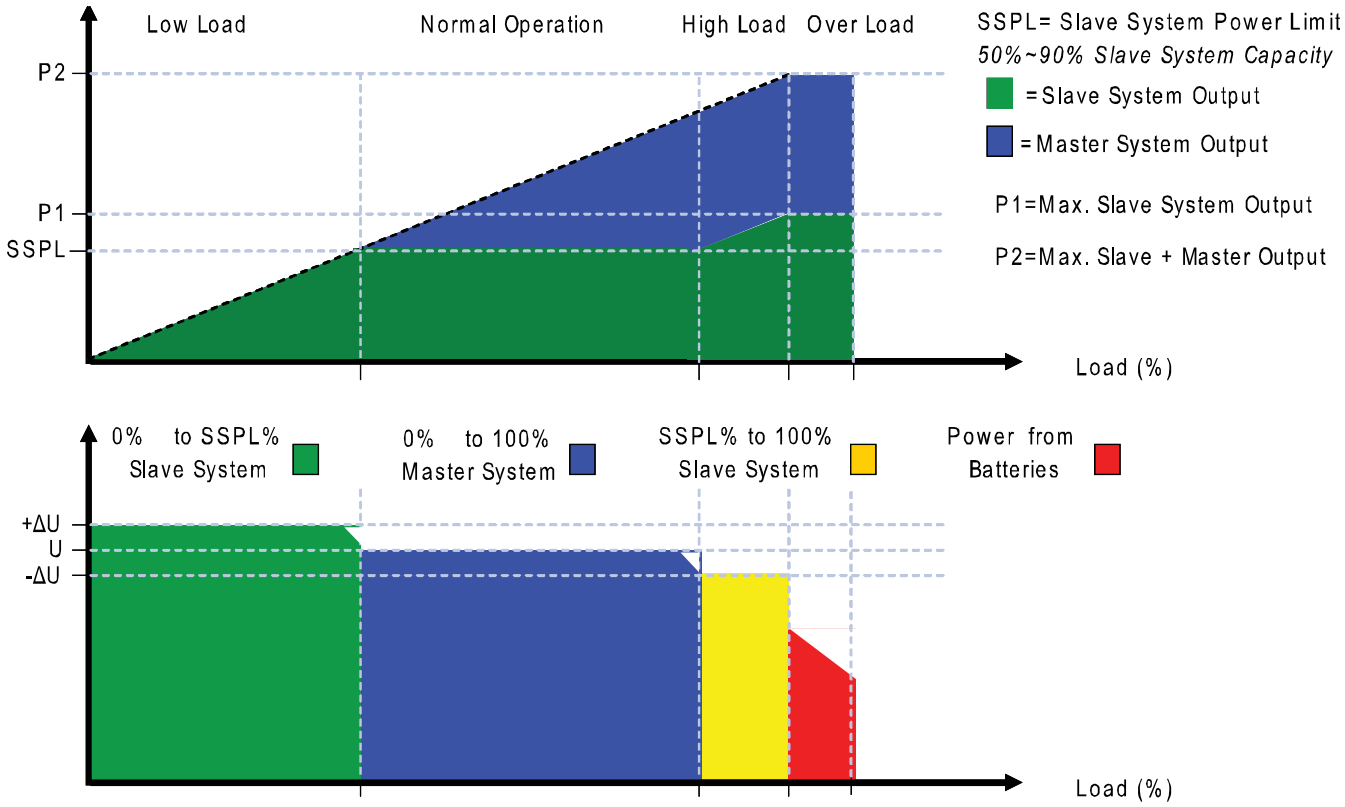
The Power Split feature allows you to connect the power system controlled via the NCU to an existing DC power system instead of extending or completely replacing the existing DC power system.

The power system controlled via the NCU functions as a slave system to share load (split output) with the existing system (master system) that requires expansion. The NCU does not require communication with the master system's Controller.

The Power Split feature provides for the sharing of total load in a controlled manner between the paralleled power systems.

When Power Split is programmed, the NCU adjusts rectifier output voltage per load demands to ensure proper sharing between the slave and master power systems. See Figure 5.

Figure 5. Power Split Feature



DIESEL MANAGEMENT FEATURE

The Diesel Management feature is available when an SM-AC supervisory module is connected to the NCU. The Diesel Management feature consists of a Diesel Test. The Diesel Test can be performed at specific intervals or a User can manually start the Diesel Test. The NCU records the test results.

SUPERVISORY MODULE (SM MODULES) MONITORING

Various devices (supervisory modules) can be connected to the NCU to extend its monitoring capabilities.

HYBRID CONTROL FUNCTION (SUPPORTING GENERATOR, SOLAR AND WIND ENERGY INPUT, AND OPTIMIZATION)

Hybrid Control is designed for use in new installations or as an upgrade of existing sites powered by a diesel generator(s) when grid power is not available. The Hybrid control is also applicable to sites with highly unreliable or frequently unavailable grid power connection. The primary power source is still considered to be the diesel generator(s). Since grid power is always given priority, the primary power source is still considered to be the grid power.

Note: *The Hybrid Control function requires a specific configuration. Hybrid Control menus will not normally be displayed unless your NCU has been configured by Emerson for this function. Contact Emerson for a Hybrid Control configuration.*

General

Hybrid Control allows the option of selecting one of the following: Fixed Daily Time based operation or Capacity Discharge based operation.

Fixed Daily Time based operation is intended to be used with a combination of AC powered active cooling (air conditioners) and DC powered cooling (heat exchangers, etc.). The cycle period is synchronized to the 24hrs day-night cycle. It makes optimum use of the different temperature conditions during the day and the night in order to facilitate Hybrid fuel saving operation.

Capacity Discharge based operation is intended for sites utilizing only DC powered cooling (heat exchangers, etc.). The cycle period is determined by User selectable depth of discharge (DOD) of the batteries per cycle, and associated recharge time. It provides optimum Hybrid fuel saving operation.

Operation from Grid Power is performed with both Fixed Daily Time and Capacity Discharge modes of operation. Grid power is always given priority when available.

As the two types of control are specific to the hardware configuration of the site, the Fixed Daily Time or Capacity Discharge is a User selectable option on installation.

Hybrid Operation

Generator Control: A potential free relay contact output from the NCU interface board controls the start and stop of the diesel generator. The signal will be generated by the NCU and operates according to the Hybrid software mode of operation. The control logic is as follows:

- Energized Output Relay - Generator OFF
- De-energized Output Relay – Generator ON

This is a fail-safe logic to ensure generator operation in all cases where power or control to the relays is lost.

In addition, the type of signal to the Generator can be selected as N/O (Normally Open) or N/C (Normally Closed) by selecting the relevant output pins of the control relay.

Number of Generator Control Outputs: The NCU Hybrid software can control one or two generators. Each generator control is designated as DG1 or DG2 output. The User can select DG1, or DG2, or DG1 and DG2. When both are selected they will be alternatively used (two generators operation).

Diesel Fail Alarm: A diesel fail alarm will be generated if the Diesel Generator ON signal fails to bring the generator to operation and provide the system with AC power. Alarm will be triggered after 60 seconds (default value, settable) from ON signal. If two generator operation is selected, the second Diesel Generator ON signal will be activated simultaneously with the Diesel Fail alarm.

Battery Fuse Trip Alarm: In the event of a Battery Fuse trip condition, an alarm will be generated.

Under Voltage Alarms:

- **Under Voltage Alarm 1:** If voltage decreases below the Under Voltage Alarm 1 setting, an alarm is raised.
- **Under Voltage Alarm 2:** If voltage decreases below the Under Voltage Alarm 2 setting, the Diesel Generator is started and an alarm is raised.

LVD 1: Normal loads are disconnected.

LVD 2: Priority loads are disconnected.

Charge Voltage: Refer to Figure 6.

Equalize Charge: The battery will be recharged at the equalize voltage. This is the voltage set in the initial phase of battery recharge. See Figure 6.

As the voltage limit is reached, the charge current is gradually reduced – this effect is known as current tail. When the current tail falls below a threshold level, additional equalize charge time is added and then the recharge ends.

The equalize charge current tail threshold is settable from 0.01 to 0.05. Default setting is 0.02 (2A per 100Ah). The additional equalize charge time is settable from 0 hours to 7 hours (settable in minutes from 0 to 720), default setting is 4 hours. The duration of the equalize charge is the time from the start of the recharge to the end of the additional time. (Maximum charge time, determined from the time charge starts, is settable in the range of 5hours to 24 hours).

The end of recharge is determined by a three (3) step approach:

- Step1 - calculated battery capacity exceeds 90%. Calculation is performed by measurement of battery current and time, in Ah.
- Step 2 - charge current tail threshold is reached.
- Step 3 - additional charge time is completed.

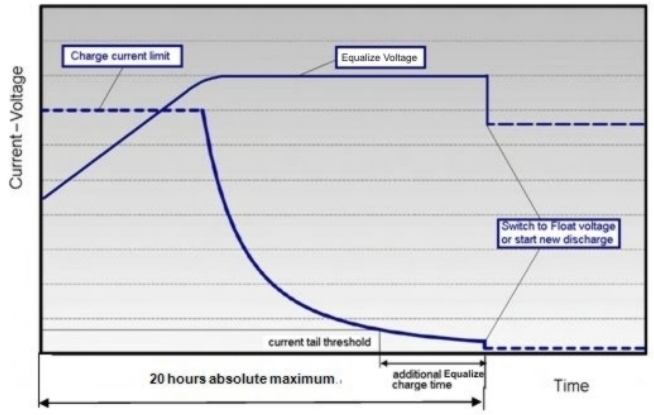
Float Charge: Default float voltage is 54.0V at 20°C with a temperature compensation of 72mV per °C.

If battery temperature exceeds 38°C, the charge voltage is reduced to 51V to reduce gassing and prevent thermal runaway. The same is applicable as well for equalizing charge.

Equalizing Charge Cycle: As the cyclic use does not ensure complete battery recharge after every cycle, an equalizing charge cycle is added. The equalizing cycle will occur up to four times a month, settable for every 7 to 60 days intervals. Start date and time is settable. Equalizing charge time is 20 hours independent of discharge time setting. Equalizing charge is performed at equalize voltage until end of additional equalize time and thereafter at float voltage for the remaining time. Also see Figure 6.

Equalize charge independently settable 0-720 min (already set in equalize charge).

Figure 6. Charge Voltage



Early Termination of the Discharge Periods

During discharge, over temperature and under voltage conditions will interrupt the discharge and change the operation to charge with the Diesel Generator ON.

Over Temperature: The diesel generator will start and run for a period before it is stopped again. The run time is User selectable in the range 30 to 120 minutes, default setting is 60 minutes. Temperature is referenced to cabinet/shelter ambient temperature sensor connected to controller, not battery temperature. Over temperature start can be disabled completely from the Settings menu.

Under Voltage: The under voltage start is triggered by under voltage alarm 2 voltage settings.

The diesel generator will start and run until the normal recharge cycle is due to finish depending on selected mode of operation.

Under Voltage with Fixed Daily Time: If the normal recharge cycle is from 7am until 7pm and under voltage has started the Diesel Generator at 5:30am, the effective recharge will be from 5:30am until 7pm.

Under Voltage with Capacity Discharge: If this mode is selected, the recharge will terminate.

Operation with Grid Power

Grid power is always used when available. If grid power becomes available during battery discharge, the discharge cycle is terminated and recharge cycle is initiated. If grid power becomes available during diesel generator operation, the diesel generator is switched OFF and operations continue on grid power.

Battery Recharge with Grid Power: Battery recharge with grid power can start from the beginning (when grid power becomes available during battery discharge) or can continue from diesel generator recharge, depending on the timing. In both cases, the recharge process will follow the recharge profile shown in Figure 6. If battery becomes fully recharged and grid power is still present, the operations will continue to be powered from grid and no battery discharge will be initiated for the duration of grid availability. In this case, battery voltage will revert back to Float voltage.

Battery Discharge after Grid Failure: At the point of grid power failure, the battery capacity is unknown as these events occur in random manner. For the purpose of maximizing the use of grid power and in anticipation of grid power becoming available again, the Hybrid operation will continue with battery discharge cycle. Discharge will continue until:

- The preset discharge time elapses (Fixed Daily Time)

- The preset DOD is reached (Capacity Discharge)

In both cases, the discharge can be terminated earlier as described in "Early Termination of the Discharge Periods" on page 8.

Relay Assignment – when in Hybrid Mode

Relay 1: Generator Alarm.
No Generator Voltage Alarm. No AC supply, 60 sec delay.

Relay 2: Battery Alarms.
Logic alarm generated from: under voltage 1, under voltage 2, LVD1, LVD2, battery high temp, battery very high temp, overvoltage 1, overvoltage 2, battery temp sensor fail, battery fuse alarms and high load alarm.

Relay 3: Rectifier Alarms.
Logic alarm generated from: multiple rectifier fail, rectifier fail, rectifier fan failure, rectifier HVSD, rectifier AC failure and rectifier not responding.

Relay 4: System Alarms .
Logic alarm generated from: load fuse alarms, high ambient temperature, ambient temp sensor fail; smoke detected, and water detection.

Relay 5: Generator Run at High Temp.
Output to intelligent cooling devices linked to AC supply (DG run).

Relay 6: Intruder Alarm.
Alarm triggered by dry contact door/motion sensor.

Relay 7: Diesel 1 in Operation.
Output to DG1 on site. DG is set on for the duration of the signal.

Relay 8: Diesel 2 in operation.
Output to DG2 on site. DG is set on for the duration of the signal.

Fixed Daily

In this mode of operation, the total duration of a complete cycle is 24hrs. This duration is necessary as the operation is synchronized with day-night temperature pattern. When an extended recharge cycle is required, its termination will still follow the 24hrs schedule.

Cycle Duration: A complete cycle consists of discharge and charge periods during the combined total of 24hrs. The discharge period starts at 7pm. It is then followed by recharge period (Diesel Generator ON) for the remainder of the 24hrs. The discharge time is User selectable in the range 1hrs to 22hrs, default setting is 12hrs.

Discharge: The discharge start time and duration are settable. Discharge period starts at 7pm. The discharge time is User selectable in the range 1hours to 22hours, default setting is 12hours.

Recharge: Recharge period (Diesel Generator ON) follows after discharge for the remainder of the 24hrs. Recharge is performed at equalize voltage until added equalize time elapses and at float voltage for the remaining charge time.

High Load Alarm: In order to identify conditions where the load requirements are exceeding the dimensioning of the Hybrid site, an alarm will be generated. The alarm will be triggered when the maximum capacity per discharge cycle is exceeded. The threshold value will be set as default to 40% of battery capacity. It will require capacity measurement per cycle. The alarm will be set once the high load threshold value is reached and is reset at the beginning of the next discharge period. This alarm will help the User identify the root cause of the under voltage condition: high demand load, the loss of capacity due to battery aging, or insufficient charge capacity.

Capacity Discharge

The cycle period is determined by User selectable capacity discharge of the batteries and associated recharge times. The cycle repeats continuously. It does not follow a 24hrs pattern.

Capacity Discharge and Recharge: The battery discharge period is determined by the percentage of the nominal battery capacity [Ah] that will be discharged per cycle.

The depth of discharge [DOD] per cycle is User selectable in the range 20% to 80%. Default setting is 60%. The value is set as battery capacity at the end of each discharge period. Therefore, if a 60% discharge is chosen, the discharge value is set to 40%.

The time to recharge to full battery capacity depends on battery capacity at the start of the charge cycle and the available recharge current.

When the additional charge time has been reached; the generator will be stopped, the recharge cycle will end, and discharge cycle will be initiated.

For practical purposes, the battery capacity at the end of every recharge period is set to 100% as long as Step1, Step 2, and Step 3 have elapsed.

If end of charge is not reached within the set maximum hours, the recharge will be terminated and discharge cycle will be initiated.

MAXIMUM CURRENT LIMIT FUNCTION

The current available from the rectifiers can be limited (in AMPS) from 10% to 121% of combined rectifier capacity. The factory setting is 121% unless otherwise specified. The current available from the converters can be programmed (in AMPS) from 50% to 116% of combined converter capacity. The factory setting is 116% unless otherwise specified. Refer to the NCU Configuration

Drawing (C–drawing) supplied with your system documentation for your system's settings.

If a rectifier or converter is added, the respective current limit point in amps will automatically increase to maintain the same percentage. For example, if the current limit was set to 100% of combined capacity and a rectifier/converter is added, the new current limit setpoint will be 100% of the combined capacity including the new rectifier/converter.

If a rectifier or converter is removed from the system (and the Rect Comm Fail or Conv Comm Fail alarm is cleared), the respective current limit point will remain unchanged unless the capacity of the remaining rectifiers or converters is not sufficient to maintain this current limit point. If that happens, the current limit point will automatically decrease to the maximum (121% of the remaining rectifiers or 116% of the remaining converters).

When setting total rectifier or total converter current limit, the set point to each unit is the total set point divided by the number of units. For example, if the system contains five rectifiers and the current limit is set to 150 amps then each rectifier has a current limit set point of 30 amps. If one or more rectifiers or converters are removed or fail it will take several seconds for the individual set points to the remaining rectifiers or converters to be reset. In the example given, if one rectifier is removed the current limit set point will drop to 120 amps (30 amps times four remaining rectifiers) until the controller can send updated set points to the remaining rectifiers. This takes a couple communication cycles (several seconds) after which each rectifier would have a new set point of 37.5 amps for a total of 150 amps. The total current limit of the rectifiers and converters should not be set such that the loss of the redundant rectifiers or converters will cause this temporary set point to drop below the actual maximum expected load. If batteries are used on the rectifier output, the batteries should support the load until the current limit set points can be re-established due to loss of a rectifier.

COMMUNICATIONS FUNCTION

The NCU is able to communicate with different equipment or, connect to different equipment for communication. See Figure 7.

a. 10M/100M Ethernet Port: The NCU can communicate with a supervisory computer or other devices through its 10M/100M Ethernet port. The communication cable shall be a shielded cable. The Ethernet port is located on the front panel of the NCU. This port supports Dynamic Host Configuration Protocol (DHCP) function.

   Note: *Some systems may have an IB4 board with a second Ethernet port. The IB4 board is connected to the NCU's backplane connector (USB) via a factory provided cable. Refer to your system's documentation for location of the IB4 board (if furnished).*

b. IB (Interface Board) and EIB (Extended Interface Board): Some systems may have an IB (Interface Board) and/or EIB (Extended Interface Board) connected to the NCU. Combinations of IBs and EIBs can provide up to thirteen (13) dry relay outputs. Every relay output has a set of NC (normally close) and NO (normally open) contacts.

   The relay outputs can be connected to customer external alarm circuits. Each relay output can be configured to change state when one or more alarm events occur.

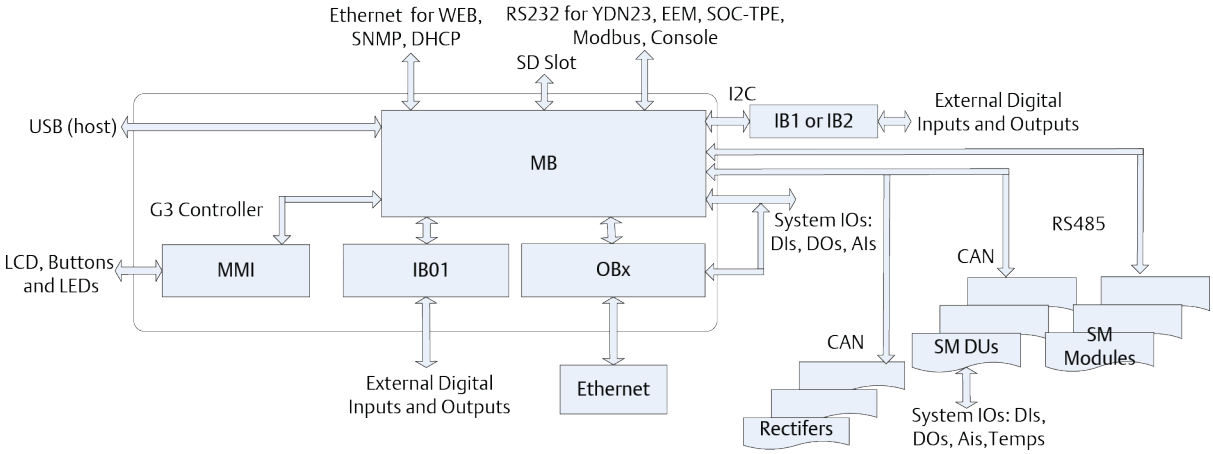
   The relay outputs can also be connected to customer external equipment, so that the relay output can control or interface with the customer external equipment.

c. IB4 (Interface Board 4): Some systems may have an IB4 board. The IB4 board is a USB to LAN converter for the NCU, which includes a USB and an Ethernet port. The IB4 board is connected to the NCU's backplane connector (USB) via a factory provided cable. Refer to your system's documentation for location of the IB4 board (if furnished).

d. RS-485 Port: The NCU can communicate with an SM-AC, SM-Bat, or SMIO through the RS-485 port. The RS-485 port uses the parameters 19200, n, 8, 1.

e. Modbus Protocol: The NCU can communicate with an AC Meter using the Modbus protocol.

Figure 7. The Controller Perspective



Operation

Local Indicators

Location and Identification: Refer to Figure 8.

Description: There are three (3) indicators located on the NCU's front panel. Refer to Table 2 for the function of the indicators.

Figure 8. Local Indicators and Menu Navigation Keys Locations

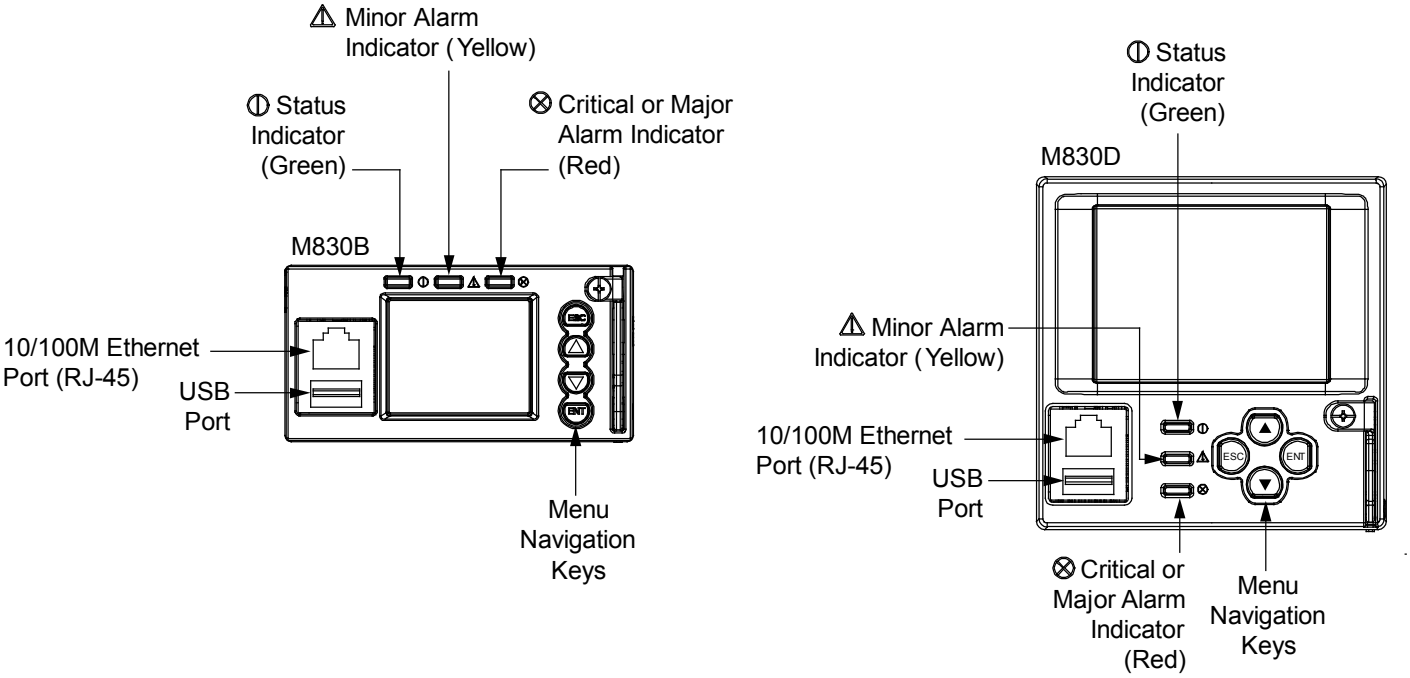


Table 2. Local Indicators

Indicator		Normal State	Fault State	Fault Cause
	Status (Green)	On	Off	No input power to the NCU.
	Minor Alarm (Yellow)	Off	On	The system has one or more active Minor alarms. Alarm conditions are programmable.
	Major or Critical Alarm (Red)	Off	On	The system has one or more active Major or Critical alarms. Alarm conditions are programmable.

Passwords and Privilege Levels

- Users (for local and Web access to the NCU) are set via the Web Interface.

  Note: *Anyone can browse the NCU via the local keypad and display. A password is required to change settings. Web access always requires a User name and password to be entered to gain access.*

- Users are configured with a User Name, password, and privilege level.

  User Name: Maximum 13 Characters (0-9, a-z, A-Z, _).

  Password: Maximum 13 Characters (0-9, a-z, A-Z, _). Passwords must be at least six (6) characters long.

  Note: *Once a password is entered, it remains in effect for a preset time period to allow navigating between menus without re-entering the password.*

  Privilege Level: Refer to Table 3. A User has access to his/her privilege level menus, plus all menus of the lesser privilege levels.

Table 3. User Privilege Levels

Privilege Level	Default User Name and Password	Authority
Level A (Browser)	none set	The User can only read (browse) information in the menus.
Level B (Operator)	none set	The User has access to the system "Control" menus.
Level C (Engineer)	none set	The User has access to the system "Settings" menus and can download the configuration package. The User does not have access to update the OS application and modify, add, or delete Users.
Level D (Administrator)	admin, 640275	The User has full access to all menus; including update the OS application and modify, add, and delete Users.

Multiple Languages Supported

Multiple languages are supported in the Local Interface and Web Interface. Refer to “Language Tab” on page 134.

Using the Local Keypad and Display

LOCAL MENU NAVIGATION KEYS AND LCD DISPLAY

Location and Identification: Refer to Figure 8.

Description: There are four (4) menu navigation keys and an LCD display located on the NCU's front panel. Refer to Table 4 for the function of the menu navigation keys.

Note: *When the LCD is lit, if no button is pushed for eight (8) minutes, the backlight of the LCD display extinguishes and the NCU returns to the Main Menu. Press any key to re-activate the LCD display.*

Table 4. Local Menu Navigation Keys

Key Symbol	Key Name	Function	
ESC	Escape	Press this key to go back to a previous menu or to cancel setting a parameter.	Press ESC and ENT together to reset the NCU, then press ENT to accept or ESC to cancel.
ENT	Enter	Press this key to go forward to the next menu, to select a parameter to edit, or to validate a parameter setting change.	
▲	Up Arrow	Press the up or down arrow keys to scroll through the menus or to change the value of a parameter.	--
▼	Down Arrow		

Press any key to silence an audible alarm.

LOCAL DISPLAY MENUS

Refer to "Local Display Menus" on page 67.

Note: *A valid password is required to access menus that allow changing any power system parameter.*

Navigating the Menus

To Select a Sub-Menu:
Press the UP and DOWN keys to highlight the desired sub-menu.
Press the ENT key to enter the selected sub-menu.

To Select a User and Enter a Password:
To select a User, use the UP and DOWN keys to move the cursor to the Select User field. Press ENT. Use the UP and DOWN keys to select a User previously programmed into the NCU. Press ENT to select the User. Note that only Users programmed into the NCU are shown. Users are programmed via the Web Interface.

To enter a password, use the UP and DOWN keys to move the cursor to the Enter Password field. Press ENT. Use the UP and DOWN keys to choose a character. Press ENT to accept and move to the next character. Continue this process until all characters are entered. Press ENT again to accept the password.

To Change a Parameter:
Press the UP and DOWN keys to move up and down the list of parameters.
Press ENT to select the parameter.
Press the UP and DOWN keys to change the parameter.
Press ENT to make the change. Press ESC to cancel the change.

Using the Web Interface

Note: *The NCU supports a 10/100M Ethernet connection.*

OVERVIEW

Via the Web Interface, a User (with proper access level) can:

- View real-time operating information (rectifiers, converters, solar converters, AC, DC, batteries, etc.).
- View and download information recorded in logs.
- Send control commands.
- Set programmable parameters.
- Download and upload configuration package.
- Download firmware to the controller.

MULTIPLE BROWSERS SUPPORTED

Multiple browsers are supported in the Web Interface. The User can use Internet Explorer, Chrome, Safari, or Firefox.

WEB INTERFACE SCREENS

Refer to “Web Interface Screens” on page 88.

PROCEDURES

Setting IP Communications Parameters (if controller not set as DHCP)

The controller’s IP parameters (IP, subnet mask, and gateway addresses) must be set to match your company’s network settings. The default settings for these parameters are shown below.

- IP Address: 192.168.1.2
- Subnet Mask Address: 255.255.255.0
- Gateway Address: 192.168.1.1

Local Menu Navigation:
Main Menu / Settings Icon / Comm Settings / enter parameters.

Web Menu Navigation:
Advance Settings Menu / Ethernet Tab / enter parameters.

Setting for DHCP

The DHCP function allows the controller to acquire an IP address automatically. This function can only be enabled or disabled via the local LCD display and keypad. If this function is enabled and the acquisition of an IP address fails, an alarm is generated. If the acquisition of an IP address is successful, you need to record the IP address automatically acquired by the controller to access the controller via the Web Interface. This IP address is displayed in the IP Address field below the DHCP setting in the local display menu (Main Menu / Settings Icon / Comm Settings).

See also next procedure for explanation of DHCP when connecting a controller directly to your computer.

Local Menu Navigation:
Main Menu / Settings Icon / Comm Settings / DHCP (set to enabled).

Web Menu Navigation:
None.

Connecting the Controller to your Local Area Network (LAN)

An Ethernet port is located on the front panel of the NCU. This port supports Dynamic Host Configuration Protocol (DHCP) function.

Some systems may have an IB4 board with a second Ethernet port. Refer to your system’s documentation for location of the IB4 board (if furnished).

- If your system **does not have** an IB4 board, connect the Local Area Network (LAN) to the NCU’s front panel port. This port can be assigned an IP address or can be set for DHCP (see above).
- If your system **has** an IB4 board, connect the Local Area Network (LAN) to the IB4 board port. The IB4 board port can be configured as a DHCP client or can be configured with an IP address. If it is a DHCP client, it will get its IP address from a DHCP server on the network.

Connecting the Controller Directly to your Computer

An Ethernet port is located on the front panel of the NCU. This port supports Dynamic Host Configuration Protocol (DHCP) function.

Some systems may have an IB4 board with a second Ethernet port. Refer to your system’s documentation for location of the IB4 board (if furnished).

- If your system **does not have** an IB4 board, connect your computer directly to the NCU's front panel port. The NCU's front panel port then needs to be configured with an IP address. This is the address you will type into your Web browser to access the NCU's Web Interface.
- If your system **has** an IB4 board, still connect your computer directly to the NCU's front panel port. The NCU's front panel port will have the following IP address: 192.168.100.100. Enter the address 192.168.100.100 in your Web browser to access the NCU's Web Interface.

  Note: *Use the IB4 board USB port to connect to a Local Area Network (LAN). The IB4 board port can be configured as a DHCP client or can be configured with an IP address. If it is a DHCP client, it will get its IP address from a DHCP server on the network.*

Use the following procedure to configure the computer connected directly to the controller.

Procedure

Note: *Windows 7 operating system is used in this procedure, other operating systems are similar.*

1. Record your computer's network settings by launching Control Panel in your computer. Navigate through Network and Sharing Center → Local Area Connection → Internet Protocol (TCP/IP) → Properties.
2. Record whether the "Obtain an IP address automatically" or "Use the following IP address" button is selected. If "Use the following IP address" button is selected, also record the following:

   IP Address: _____
   Subnet Mask: _____
   Default Gateway: _____

3. Record your controller's network settings by navigating the controller's local display panel to Main Menu / Settings Icon / Comm Settings. Record if DHCP is enabled or disabled. If DHCP is disabled, also record the following controller's IP parameters:

   IP Address: _____
   Subnet Mask: _____
   Default Gateway: _____

   Example:
   IP Address: 192.168.1.2
   Subnet Mask: 255.255.255.0
   Default Gateway: 192.168.1.1

4. **If DHCP is enabled in the controller,** select the "Obtain an IP address automatically" in your local computer's network settings.

   If DHCP is disabled in the controller, select the "Use the following IP address" button in your local computer's network settings. Then change your local computer's network settings using the information you acquired in Step 3, except that the last part of the IP address needs to be replaced with any different number.

   IP Address: _____
   Subnet Mask: _____
   Default Gateway: _____

   Example:
   IP Address: 192.168.1.3
   Subnet Mask: 255.255.255.0
   Default Gateway: 192.168.1.1

5. Select ***OK***. Note that you may have to reboot your local computer for the settings to take effect. Follow any instruction you see on the screen.

Disabling Proxy Server Settings to Enable a Connection to the Controller over an Intranet Network (if required)

Note: *This procedure needs to be performed only when the controller is connected to an Intranet and the User's computer is set to access the Intranet through a proxy server. Note that if the controller is connected to the Internet and the User's computer is connected to an Intranet, the User may not be able to disable the proxy server and access the controller.*

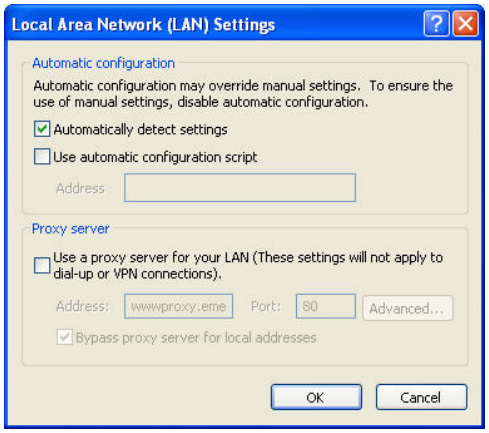
If the controller's Ethernet port is connected to your company's Intranet Network and your computer is also connected to the Intranet Network but requires access via a proxy server, you must disable the proxy server settings to access the controller. Follow the procedure below to disable the proxy server settings.

Procedure

Note: *Internet Explorer is used in this procedure, other browsers are similar.*

1. Launch "Internet Explorer".
2. Select ***Internet Options*** from the ***Tools*** menu. The "Internet Options" window opens. In the "Internet Options" window, select the ***Connections*** tab.

3. Click on the ***LAN Settings...*** button. The following window opens. In the LAN Settings window, uncheck the Proxy Server box and click ***OK***.



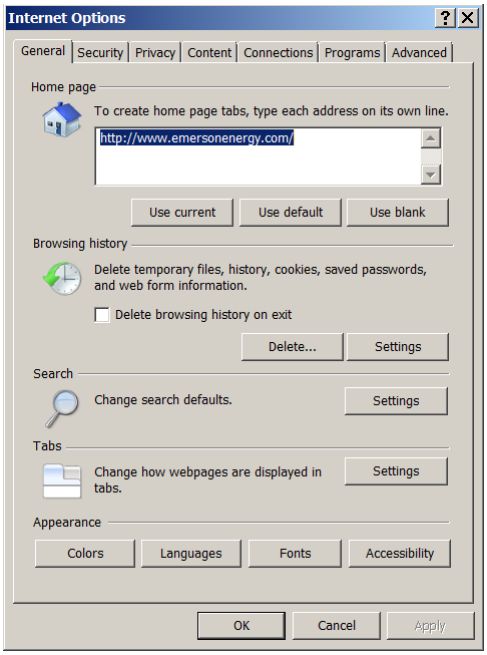
Internet Security Settings for Loading Files or Downloading Files into the NCU

Your computer's security settings may prevent you from loading files or downloading files into the NCU. Refer to the following procedure to set your computer's security settings to allow for this.

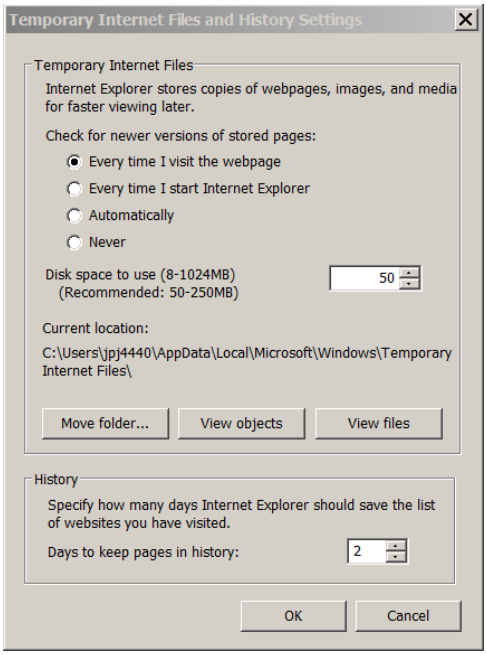
Procedure

Note: *Internet Explorer is used in this procedure, other browsers are similar.*

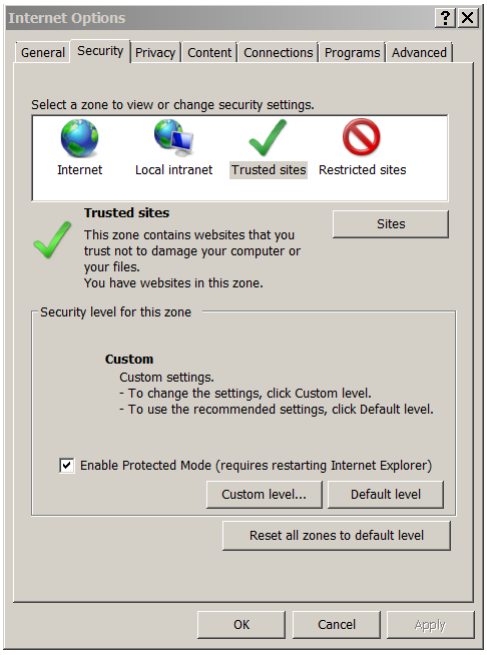
1. Launch "Internet Explorer".
2. Select ***Internet Options*** from the ***Tools*** menu. The "Internet Options" window opens. In the "Internet Options" window, select the ***General*** tab.



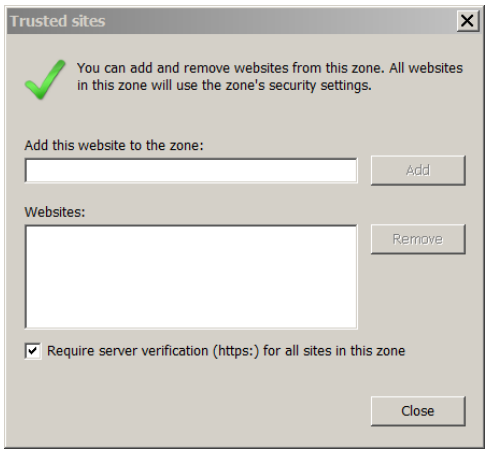
3. Click on the ***Settings...*** button. The following window opens. In the ***Settings*** window, choose "***Every time I visit the webpage***" and click OK.


Temporary Internet Files and History Settings
Temporary Internet Files
Internet Explorer stores copies of webpages, images, and media for faster viewing later.
Check for newer versions of stored pages:
Every time I visit the webpage
Every time I start Internet Explorer
Automatically
Never
Disk space to use (8-1024MB)
(Recommended: 50-250MB)
50
Current location:
C:\Users\jpj4440\AppData\Local\Microsoft\Windows\Temporary Internet Files\
Move folder...
View objects
View files
History
Specify how many days Internet Explorer should save the list of websites you have visited.
Days to keep pages in history:
2
OK
Cancel

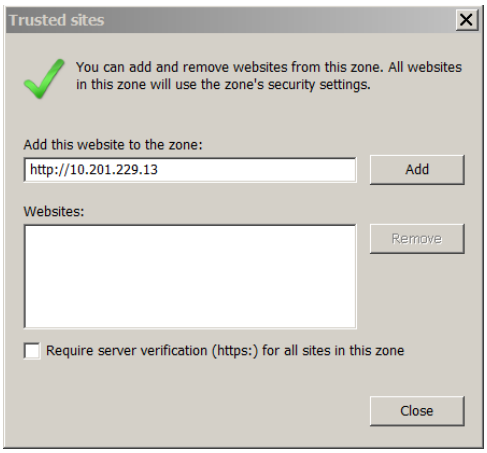
4. In the "Internet Options" window, select the ***Security*** tab.



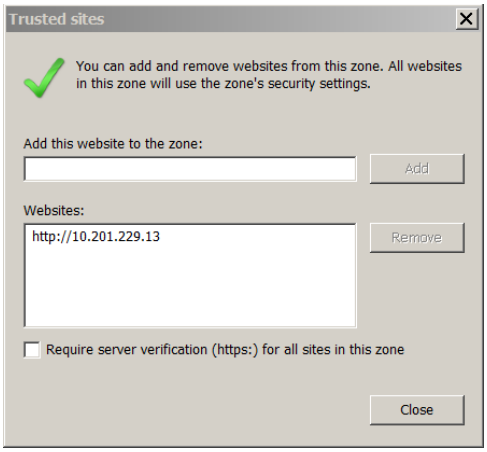
5. Click on ***Trusted sites***. With "***Trusted sites***" selected, click "***Sites***". The following window opens. Uncheck the "Require server verification (https:) for all sites in the zone:" box if https is not being used.


Trusted sites
You can add and remove websites from this zone. All websites in this zone will use the zone's security settings.
Add this website to the zone:
Add
Websites:
Remove
Require server verification (https:) for all sites in this zone
Close

6. In the ***Trusted sites*** window, type or copy the NCU+ URL in the "***Add this website to the zone:***" box.


Trusted sites
You can add and remove websites from this zone. All websites in this zone will use the zone's security settings.
Add this website to the zone:
http://10.201.229.13
Add
Websites:
Remove
Require server verification (https:) for all sites in this zone
Close

7. Click ***Add***. The NCU+ URL is listed in the ***Websites***: box. Click ***Close***.


Trusted sites
You can add and remove websites from this zone. All websites in this zone will use the zone's security settings.
Add this website to the zone:
Add
Websites:
http://10.201.229.13
Remove
Require server verification (https:) for all sites in this zone
Close

Logging into the Controller

Procedure

Internet Explorer, version 6 or newer, is supported (IE 8.0 is recommended). Chrome, Safari, and Firefox are also supported.

1. In your browser, enter http:// and the controller's IP address and press ***ENTER***. If your site requires secure HTTP and you were furnished with an NCU configuration with secure HTTP, enter https:// and the controller's IP address and press ***ENTER***. The following Web Interface Login window opens. Enter a valid ***User Name*** and ***Password***, then click ***LOGIN***.

Note: *By default, the "User Name" is "admin" and the "Password" is "640275". It is recommended to change the default password the first time you login using the default User Name admin.*

Note: *Before entering a User Name and password, you can select a local language that the Web Interface menus use from those listed in the top right corner of the login window. See "Language Tab" on page 134.*

2. After entering a valid ***User Name*** and ***Password*** and clicking ***LOGIN***, the Web Interface "HOMEPAGE" window opens. Refer to "Web Interface Screens" on page 88.
3. If you forgot your password, click ***Forgot Password***. A "Find Password" window opens. Enter your User Name and click ***Find Password***. The controller sends the password to the email address previously programmed for this User Name.

Note: *The email address is set via the Web Interface: Advanced Settings Menu / Alarm Report Tab / SMTP Section / Email To parameter*

Common Tasks Performed via the Local Keypad and/or Web Interface

PROCEDURES

Note: *Ensure current configuration is backed up prior to changing settings (see "Backing Up the NCU Configuration" on page 26). Create new backup files after every successful update for your records and in case of controller failure.*

Refer also to "Local Display Menus" on page 67 and "Web Interface Screens" on page 88 for menu item descriptions.

Start Wizard

For initial startup, perform the Start Wizard from the local keypad and display to enter basic programmable parameters in one session. Refer to "Start Wizard Sub-Menu (accessed from Settings Menu)" on page 77 and "**Start Wizard Now**" on page 86.

Viewing Alarms

Local Menu Navigation:
Main Menu / Alarm Icon / ENT.

Web Menu Navigation:
Active alarms are listed in the lower right window pane. If the window pane is collapsed, click the "arrow" icon to expand the alarm list.

Viewing System Status

Local Menu Navigation:
Main Menu / Input Power Icon / ENT.
Main Menu / Module Icon / ENT.
Main Menu / DC Icon / ENT.
Main Menu / Battery Icon / ENT.

Web Menu Navigation:
System status is displayed in the right window pane of the Home page. Select the Power System tab and use the interactive links to view the various device group status pages. See "Device Group Status Pages" starting on page 92.

Viewing the NCU Controller's Device Inventory

Local Menu Navigation:
Main Menu / ESC to view Info Screens / ENT to view Inventory.

Web Menu Navigation:
System Inventory Menu.

Clearing or Resetting Alarms

Local Menu Navigation:
Main Menu / Settings Icon / Alarm Settings / select alarm to clear or reset.

Web Menu Navigation:
Settings Menu / navigate the various device tabs to select an alarm to clear.

Clearing Logs

Local Menu Navigation:
None.

Web Menu Navigation:
Advance Settings Menu / Clear Data Tab / select log to clear.

Disabling the Local Keypad Sound

Local Menu Navigation:
Main Menu / Settings Icon / Sys Settings / Keypad Voice.

Web Menu Navigation:
None.

Blocking Alarms

Local Menu Navigation:
Main Menu / Settings Icon / Alarm Settings / Alarm Blocked.

Web Menu Navigation:
Settings Menu / System Tab / Power System / Outgoing Alarms Blocked.

Changing the Date

Local Menu Navigation:
Main Menu / Settings Icon / Sys Settings / Date.

Use the Up Arrow and Down Arrow to select the date field. Press ENT. Use Up Arrow and Down Arrow to select the year then press ENT, next use Up Arrow and Down Arrow to select the month then press ENT, and finally use Up Arrow and Down Arrow to select the day then press ENT.

Web Menu Navigation:
Settings Menu / Time Settings Tab.

Changing the Time

Local Menu Navigation:
Main Menu / Settings Icon / Sys Settings / Time.

Use the Up Arrow and Down Arrow to select the time field. Press ENT. Use Up Arrow and Down Arrow to select the hour then press ENT, next use Up Arrow and Down Arrow to select the minute then press ENT, and finally use Up Arrow and Down Arrow to select the second then press ENT.

Web Menu Navigation:
Settings Menu / Time Settings Tab.

Adding, Deleting, and Modifying Users

Local Menu Navigation:
None.

Web Menu Navigation:
Advance Settings Menu / Users Tab.

Setting IP Communications Parameters (if controller not set as DHCP)

See also “Setting IP Communications Parameters” on page 15.

Local Menu Navigation:
Main Menu / Settings Icon / Comm Settings / enter parameters.

Web Menu Navigation:
Advance Settings Menu / Ethernet Tab / enter parameters.

Setting for DHCP

The DHCP function allows the controller to acquire an IP address automatically. This function can only be enabled or disabled via the local LCD display and keypad. If this function is enabled and the acquisition of an IP address fails, an alarm is generated. If the acquisition of an IP address is successful, you need to record the IP address automatically acquired by the controller to access the controller via the Web Interface. This IP address is displayed in the IP Address field below the DHCP setting in the local display menu (Main Menu / Settings Icon / Comm Settings).

See also "Connecting the Controller Directly to your Computer" on page 15 for explanation of DHCP when connecting a controller directly to your computer.

Local Menu Navigation:
Main Menu / Settings Icon / Comm Settings / DHCP (set to enabled).

Web Menu Navigation:
None.

Setting SNMP Parameters

Local Menu Navigation:
None.

Web Menu Navigation:
Advance Settings Menu / SNMP Tab.

Setting Auto Equalize

Local Menu Navigation:
Main Menu / Settings Icon / Batt Settings / Charge / Auto EQ.
Also enter additional parameters from Web Interface (Settings Menu / Battery Tab / enter parameters)

Web Menu Navigation:
Settings Menu / Battery Tab / Automatic Equalize (set to Yes) then enter the following parameters.

- Equalize Start Current
- Equalize Start Capacity
- Equalize Stop Current
- Equalize Stop Delay Time
- Maximum Equalize Charge Time

Programming the Audible Alarm Feature

Local Menu Navigation:
Main Menu / Settings Icon / Alarm Settings / Audible Alarm.

Web Menu Navigation:
None.

Manually Forcing LVDs

Local Menu Navigation:
Main Menu / Settings Icon / Maintenance / "Auto/Man" State (change to Manual).
then
Main Menu / Settings Icon / Maintenance / LVD 1 Control or LVD 2 Control (select the other state).
then
Main Menu / Settings Icon / Maintenance / LVD 1 Control or LVD 2 Control (select the original state).
then
Main Menu / Settings Icon / Maintenance / "Auto/Man" State (change to Auto).

Web Menu Navigation:
Settings Menu / System Tab / Power System / "Auto/Manual" State (change to Manual).
then
Settings Menu / LVD Tab / LVD 1 Control or LVD 2 Control (select the other state).
then
Settings Menu / LVD Tab / LVD 1 Control or LVD 2 Control (select the original state).
then
Settings Menu / System Tab / Power System / "Auto/Manual" State (change to Auto).

Manually Forcing Relays

After completing the following steps, the relay will momentarily toggle to the chosen state. The relay then reverts back to being controlled by the NCU.

Note: *This may take a few minutes.*

See also "Using the Relay Test Feature" on page 25.

Local Menu Navigation:
None.

WEB Menu Navigation:
Settings Menu / System Tab / Power System / "Auto/Manual" State (change to Manual).
then
Settings Menu / System Tab / Power System / Relay # (select the other state).
then
Settings Menu / System Tab / EIB Equipment / EIB 1 / Relay # (select the other state).
then
Settings Menu / System Tab / Power System / "Auto/Manual" State (change to Auto).

Assigning Severity Level to Alarms

Local Menu Navigation:
None.

Web Menu Navigation:
Advance Settings Menu / Alarms Tab and DI Alarms Tab.

Assigning Relays to Alarms

Local Menu Navigation:
None.

Web Menu Navigation:
Advance Settings Menu / Alarms Tab and DI Alarms Tab.

Placing the System in Float or Equalize Charge Mode

Local Menu Navigation:
Main Menu / Settings Icon / Maintenance / “EQ/FLT Control”.

Web Menu Navigation:
Settings Menu / Battery Tab / “Equalize/Float” Charge Control.

Viewing/Changing the Float Voltage Setting

Local Menu Navigation:
Main Menu / Settings Icon / Batt Settings / Charge / Float Voltage.

Web Menu Navigation:
Settings Menu / Battery Tab / Float Charge Voltage.

Viewing/Changing the Equalize Voltage Setting

Local Menu Navigation:
Main Menu / Settings Icon / Batt Settings / Charge / EQ Voltage.

Web Menu Navigation:
Settings Menu / Battery Tab / Equalize Charge Voltage.

Setting Battery Parameters

Local Menu Navigation:
Main Menu / Settings Icon / Batt Settings / navigate menus and enter parameters.

Web Menu Navigation:
Settings Menu / Battery Tab / enter parameters.

Setting Battery Capacity Parameters

Local Menu Navigation:
Main Menu / Settings Icon / Batt Settings / Batt1 Settings or Batt2 Settings / Rated Capacity.

Web Menu Navigation:
Settings Menu / Battery Tab / Batt1 Rated Capacity and Batt2 Rated Capacity.
or
See “Individual Battery Settings Page” on page 99.

Setting Rectifier High Voltage Shutdown

Local Menu Navigation:
None.

Web Menu Navigation:
Settings Menu / Rectifiers Tab / HVSD (set to enabled) then set HVSD Limit.

Setting Rectifier Current Limit

Local Menu Navigation:
Main Menu / Settings Icon / Rect Settings / Current Limit (set to enabled) then set Curr Limit Pt.

Web Menu Navigation:
Settings Menu / Rectifiers Tab / Current Limit (set to enabled) then set Current Limit Point.

Setting Over Voltage Alarm 1

Local Menu Navigation:
Main Menu / Settings Icon / Sys Settings / Over Voltage 1.

Web Menu Navigation:
Settings Menu / System Tab / Power System / Over Voltage 1.

Setting Over Voltage Alarm 2

Local Menu Navigation:
Main Menu / Settings Icon / Sys Settings / Over Voltage 2.

Web Menu Navigation:
Settings Menu / System Tab / Power System / Over Voltage 2.

Setting Under Voltage Alarm 1

Local Menu Navigation:
Main Menu / Settings Icon / Sys Settings / Under Voltage 1.

Web Menu Navigation:
Settings Menu / System Tab / Power System / Under Voltage 1.

Setting Under Voltage Alarm 2

Local Menu Navigation:
Main Menu / Settings Icon / Sys Settings / Under Voltage 2.

Web Menu Navigation:
Settings Menu / System Tab / Power System / Under Voltage 2.

Setting Temperature Sensors

Temperature sensors may be connected to the…

- System Temperature Ports 1, 2, 3 (if available),
- Temp1 and Temp2 ports on an IB2 Interface Board,
- Temp1 and Temp2 ports on an EIB Interface Board, and
- Temp1 through Temp8 ports of up to eight (8) SM-Temp modules.

Each port (sensor) may be set as None, Battery, or Ambient.

A temperature sensor set as an ambient temperature sensor may also be set as the sensor which displays the ambient temperature on the Web Interface's Homepage.

A temperature sensor set as a battery temperature sensor may also be set as the temperature compensation sensor (in addition, the temperature compensation sensor is the sensor which displays the battery temperature on the Web Interface's Battery Device Group Status Page).

A temperature sensor set as a battery temperature sensor may also be set as the BTRM (Battery Thermal Runaway Management) sensor (in addition, the BTRM sensor is the sensor which is used for the High Temperature Disconnect [HTD] Feature.)

Procedure

1. Set each temperature sensor in the system to None, Battery, or Ambient.

   Local Menu Navigation:
   None.

   Web Menu Navigation:
   Settings Menu / Temp Probes Tab.

   Also enter values for the temp probe temperature alarms from the Web Interface (Settings Menu / Temp Probes Tab).

2. If desired, set a temperature sensor set as an ambient temperature sensor as the sensor which displays the ambient temperature on the Web Interface's Homepage.

   Local Menu Navigation:
   None.

   Web Menu Navigation:
   Settings Menu / System Tab / Power System / Ambient Temp Sensor.

   Also enter values for the ambient temperature alarms from the Web Interface (Settings Menu / System Tab / Power System).

3. If desired, set a temperature sensor set as a battery temperature sensor as the battery temperature compensation sensor.

   Local Menu Navigation:
   Main Menu / Settings Icon / Batt Settings / Temp Comp / TempComp Sensor.

   Web Menu Navigation:
   Settings Menu / Battery Tab / Temp Compensation Probe.

   Also enter values for the compensation temperature alarms from the Web Interface (Settings Menu / Battery Tab).

4. If desired, set a temperature sensor set as a battery temperature sensor as the BTRM sensor.

   Local Menu Navigation:
   None.

   Web Menu Navigation:
   Settings Menu / Battery Tab / BTRM Temp Sensor.

   Also enter values for the BTRM temperature alarms from the Web Interface (Settings Menu / Battery Tab).

Setting Battery Charge Temperature Compensation

The following need to be set for the Battery Charge Temperature Compensation feature.

See above for selecting the battery temperature compensation temperature sensor (or select maximum, average, or Average SMBRC) and setting compensation temperature alarms.

Local Menu Navigation:
Main Menu / Settings Icon / Batt Settings / Temp Comp.

Enter values for the following parameters: TempComp Center, Temp Comp Coeff, Temp Comp Clamp, Temp Comp Max V, Temp Comp Min V (note that you have to enable "Temp Comp Clamp" to set the Temp Comp Max V and Min V values).

Web Menu Navigation:
Settings Menu / Battery Tab.

Enter values for the following parameters:
Temp Compensation Center, Temp Comp Coefficient (slope), Temp Comp Voltage Clamp, Temp Comp Max Voltage, and Temp Comp Min Voltage (note that you have to enable "Temp Comp Voltage Clamp" to set the Temp Comp Max Voltage and Min Voltage values).

Setting Battery Thermal Runaway Management (BTRM) Feature

The following need to be set for the Battery Thermal Runaway Management (BTRM) feature.

See above for selecting the Battery Thermal Runaway Management (BTRM) temperature sensor and setting BTRM temperature alarms.

Local Menu Navigation:
None.

Web Menu Navigation:
Settings Menu / Battery Tab.

Enter values for the following parameters:
"BTRM Action" and "BTRM Voltage".

Configuring the NCU Identification of Rectifiers and Assigning which Input Feed is Connected to the Rectifiers

When rectifiers are all installed prior to applying power and starting the system, the order in which the NCU identifies the rectifiers is by serial number (lowest serial number is Rect 1, next lowest is Rect 2, etc.). If you prefer the NCU to identify the rectifiers by position in the system, perform the following procedure.

Upon power up, the NCU arbitrarily assigns Feed AC1, AC2, or AC3 to each rectifier. This assignment is used to display rectifier AC input feed voltage(s). The User may reassign the feed to each rectifier per your specific installation by following the procedure below.

Local Menu Navigation:
None.

Web Menu Navigation:
See "Individual Rectifier Settings Page" on page 93 and set the Rectifier ID and AC Feed (repeat for every rectifier).
then
Settings Menu / Rectifiers Tab / "Confirm Rect ID/Feed".

Configuring the NCU Identification of Converters

When converters are all installed prior to applying power and starting the system, the order in which the NCU identifies the converters is by serial number (lowest serial number is Conv 1, next lowest is Conv 2, etc.). If you prefer the NCU to identify the converters by position in the system, perform the following procedure.

Local Menu Navigation:
None.

Web Menu Navigation:
See "Individual Converter Settings Page" on page 96 and set the Converter ID (repeat for every converter).
then
Settings Menu / "DC/DC" Converters Tab / Confirm Converter ID.

Setting Digital Inputs

Local Menu Navigation:
None.

WEB Menu Navigation:
Settings Menu / System Tab / Power System / DI[number] Alarm State.
or
Advance Settings Menu / DI Alarms Tab

Setting Battery Block and Battery Midpoint Monitoring (if equipped with an EIB Assembly)

Local Menu Navigation:
None.

WEB Menu Navigation:
Settings Menu / System Tab / EIB Equipment / EIB 1 and enter the following parameters.

<u>Parameters</u>

- Voltage Type

- Block In-Use Num
- Block Voltage Diff(12V) or Block Voltage Diff(Mid)

Setting External Shunts (connected to the EIB Assembly)

Local Menu Navigation:
None.

WEB Menu Navigation:
Settings Menu / System Tab / EIB Equipment / EIB 1and enter the following parameters.

Parameters

- Shunt # Set As (Not Used, General, Load, Battery)
  a. Not Used: Indicates this shunt input is not used.
  b. General: Indicates the measurement of the shunt will be displayed and will not be added to Total DC Load or Total Battery Load.
  c. Load: Indicates the measurement of the shunt will be displayed and added to the Total DC Load.
  d. Battery: Indicates the measurement of the shunt will be displayed and added to the Total Battery Load and used with Battery Management.
- Shunt # Full Current
- Shunt # Full Voltage

Setting External Shunts (connected to the SM-DU+ Assembly)

Local Menu Navigation:
None.

WEB Menu Navigation:
Settings Menu / System Tab / SMDUP Equipment / SMDUP # and enter the following parameters.

Parameters

- Shunt # Current (Rating of Shunt.)
- Shunt # Voltage (Rating of Shunt.)
- Current # Break Value (Device Rating.)
- Current # High Current Limit (% of Current # Breaker Value.)
- Current # Very High Current Limit (% of Current # Breaker Value.)

Setting the System Current Alarm

Local Menu Navigation:
None.

WEB Menu Navigation:
Settings Menu / System Tab / Power System / System Current Alarm (Enter a value (in AMPS). If load current exceeds this value, a system current alarm is issued.).

Using the Relay Test Feature

Note: *The relay test can only be performed when no alarms are present.*

Automatic Test

When placed in Relay Automatic Test Mode, all relays on the IB2 board energize (when set for Fail Safe) and all relays on the EIB board (if equipped) de-energize (when set for Fail Safe). Then one-by-one each relay on the IB2 board deenergizes for the time period selected, and then energizes. If the system is equipped with an EIB board, after the IB2 relays are tested, one-by-one each relay on the EIB board energizes for the time period selected, and then deenergizes. At the end of the test, all relays are returned to their normal state (if no alarms are present).

Local Menu Navigation:
None.

WEB Menu Navigation:
Settings Menu / System Tab / Power System / set the Relay Test Time.
then
Settings Menu / System Tab / Power System / Relay Test (set to Automatic).

Note: *The relay test can be exited at any time by setting the Relay Test to Disabled.*

Manual Test

When placed in Relay Manual Test Mode, all relays on the IB2 board energize (when set for Fail Safe) and all relays on the EIB board (if equipped) de-energize (when set for Fail Safe). Then you can individually change each relay's state. The relay changes state for the time period selected. At the end of the test, all relays are returned to their normal state (if no alarms are present). This is the same procedure as "Manually Forcing Relays" on page 21 except you do not place the controller in Manual Mode.

Local Menu Navigation:
None.

WEB Menu Navigation:
Settings Menu / System Tab / Power System / Relay Test (set to Manual).
then
Settings Menu / System Tab / Power System (individually you can set the state of the relays on the IB2 Board).
then
Settings Menu / System Tab / EIB Equipment / EIB 1 (individually you can set the state of the relays on the EIB Board).
then
Settings Menu / System Tab / Power System / Relay Test (set to Automatic).

Clearing the Maintenance Alarm

A maintenance time can be set which, once expires, issues a maintenance alarm. When the maintenance alarm is issued, perform the routine maintenance and reset the maintenance timer. To reset the maintenance timer and clear the Maintenance Alarm, clear the Maintenance Run Time.

Local Menu Navigation:
None.

WEB Menu Navigation:
Settings Menu / System Tab / Power System / "Auto/Manual" State (change to Manual).
then
Settings Menu / System Tab / Power System / Clear Maintenance Run Time.
then
Settings Menu / System Tab / Power System / "Auto/Manual" State (change to Auto).

Performing a Manual Battery Discharge Test

Procedure

1. Check that the Rated Battery Capacity is set up correctly for each battery.
   Local Menu: Main Menu / Settings Icon / Batt Settings / Battery Test.
   Web Menu: Settings Menu / Battery Test
2. Check that the following Battery Test parameters are set correctly: Test Voltage Level, End Test Voltage, End Test Time, End Test Capacity, Record Threshold.
   Local Menu: Main Menu / Settings Icon / Batt Settings / Battery Test.
   Web Menu: Settings Menu / Battery Test / Battery Test Control.
3. Start the battery discharge test.
   Local Menu: Main Menu / Settings Icon / Maintenance / BattTestControl.
   Web Menu: Settings Menu / Battery Test / Battery Test Control.
4. Wait for the test to end.
5. View the battery test log and upload it to your computer as required. See "Battery Test Log Tab" on page 120.

Updating the NCU Controller's Device Inventory

Local Menu Navigation:
Main Menu / Settings Icon / Other Settings / Auto Config.

Web Menu Navigation:
Advance Settings Menu / SW Maintenance Tab / Auto Config.

Backing Up the NCU Configuration

There are two steps in backing up the system's NCU configuration:

- Save the NCU configuration package. This package includes the base configuration and any changes made to alarm severity levels, relay assignments, and signal names.

WARNING! This file is NOT forward compatible.

- Save a file named "SettingParam.run". This file contains changes made to alarm setpoints and other settings such as float/ equalize voltage, etc. A file named "SettingParam.run" is automatically created/appended by the controller whenever a User (or the factory at the time of shipment) makes changes to parameter settings via the LCD or Web Interface. This file can be saved to your computer so you can restore any custom settings you may have made.

  Note: *It is strongly recommended that you save a copy of the SettingParam.run file whenever you customize any parameter settings. Then, if you ever replace the controller or perform a "Restore Defaults" procedure, you can restore your customized settings by downloading the previously saved SettingParam.run file back into the controller.*

Prior to changing settings, ensure the current configuration package and "SettingParam.run" files are backed up. After making changes, create new backup files.

To aid in file management, you may change the name of the configuration package "app_cfg.tar" to differentiate it from other "app_cfg.tar" files saved. The new name can use alpha and numeric characters preceding the original "app_cfg.tar" name (the end of the new file name **must** always be "app_cfg.tar"; for example, an acceptable filename would be "seville4app_cfg.tar").

To aid in file management, you may change the name of the "SettingParam.run" file to differentiate it from other "SettingParam.run" files saved. The new name can use alpha and numeric characters preceding the original "SettingParam.run" name (the end of the new file name **must** always be "SettingParam.run"; for example, an acceptable filename would be "seville4SettingParam.run").

Saving the Configuration Package

Local Menu Navigation:
None.

Web Menu Navigation:
Advance Settings Menu / SW Maintenance Tab.
See "Upload/Download Procedure" on page 138 to save the "Configuration Package" to your computer.

Saving the SettingParam.Run File

Local Menu Navigation:
None.

Web Menu Navigation:
Advance Settings Menu / SW Maintenance Tab.
See "Retrieve Setting Param.run Procedure" on page 137 to retrieve the SettingParam.run file.

Reloading a Backed-Up NCU Configuration

There are two steps in reloading a backed-up NCU configuration.

- One step to reload the saved NCU configuration package.
- One step to reload the saved "SettingParam.run" file.

Reloading the Configuration Package

Local Menu Navigation:
None.

Web Menu Navigation:
Advance Settings Menu / SW Maintenance Tab.
See "Upload/Download" on page 138 to download a configuration package into the controller.

Reloading the SettingParam.Run File

Local Menu Navigation:
None.

Web Menu Navigation:
Advance Settings Menu / SW Maintenance Tab.
See "Upload/Download Procedure" on page 138 to download a "SettingParam.run" file into the controller.

Upgrading the NCU Using an Application ("All") Package

This procedure is typically used to upgrade your NCU when a new release of firmware is available for you application. The name of the Application "All" Package file must end in .tar or .tar.gz. An Application "All" package file has both the application (software) and configuration package and is usually supplied for an application upgrade.

A User can copy an Application ("All") Package from your computer to a USB memory device. You can then place the USB memory device into the NCU USB port and then download the file into the NCU Controller.

Local Menu Navigation (To Download an Application ("All") Package):

1. Copy the file to a USB memory device. The file must be in the root directory of the USB memory device. The file must be named app_Vxxx.tar.gz.
2. Connect the USB memory device to the USB port on the front of the controller.
3. Navigate to "Main Menu / Settings Icon / Sys Settings / Update App / select yes". Once Yes is selected and confirmed, the configuration file located on the memory device located in the controller's USB port is loaded into the controller.
4. Return to the Main Screen, and then reboot the controller (press ENT and ESC at the same time).
5. The screen displays "OK to reboot? ESC to cancel! ENT to OK." Press ENT to reboot.
6. The controller enters an initialization routine, which takes a few minutes. The routine is complete and the controller is operational when normal system voltage is displayed on the screen.
7. Remove the memory device.

Web Menu Navigation (To Download an Application ("All") Package):

Advance Settings Menu / SW Maintenance Tab.
See "Upload/Download Procedure" on page 138 to download an Application ("All") Package into the controller.

Restoring Factory Default Configuration

This procedure is typically used to restore any changes made to any settings, relay assignments, alarm severities, or signal names. This file is not shipped with the system. There are one or two steps required to restore your NCU as shipped.

- One step to restore the factory default configuration (required only if you made any changes to relay assignments, alarm severities, or signal names).
- One step to reload the "SettingParam.run" file (required only if you made any setting changes like float/ equalize voltage or alarm thresholds).

  Your system may have been configured for specific options at the factory which creates a "SettingParam.run" file. Restoring the factory default configuration returns the system to the settings of the default configuration. These are the settings before specific options may have been configured by the factory. To restore the system to the settings as shipped, after restoring the factory default configuration, you must reload the factory "SettingParam.run" file.

Note: *If a system was shipped with factory modified settings, the system may be supplied with a USB memory device that contains a "SettingParam.run" file as shipped. If provided, the "SettingParam.run" file has a seven-digit UIN (Unique Identification Number) preceding the "SettingParam.run" filename. The UIN identifies a "SettingParam.run" file for use with a specific system. This file can be used to restore your system to the configuration as shipped. Refer to "Reloading a Backed-Up NCU Configuration" on page 27 to reload the supplied "SettingParam.run" file.*

Procedure

WARNING! When this procedure is performed, the controller's existing configuration and parameter settings will be lost. The "SettingParam.run" file is deleted. Before restoring the factory default configuration, if you have made changes to any setting save the "SettingParam.run" file or if you have made any name changes, relay assignments, or alarm severities save the configuration package (see Backing Up the NCU Configuration on page 26).

AFTER PERFORMING THIS PROCEDURE, RELOAD THE "SETTINGPARAM.RUN" FILE AND CONFIGURATION PACKAGE, IF REQUIRED.

Local Menu Navigation:
Main Menu / Settings Icon / Sys Settings / Restore Default.

Web Menu Navigation:
Advance Settings Menu / SW Maintenance Tab.
See "Restore Factory Default Configuration Procedure" on page 136.

Rebooting the Controller

Local Menu Navigation:
At the Main Screen, press ENT and ESC at the same time to reset the NCU Controller.

Web Menu Navigation:
Advance Settings Menu / SW Maintenance Tab / Reboot Controller button.

Power Split Feature

In Power Split applications, the output of the power system controlled by the NCU can be connected in parallel with an existing power system. Each system is controlled independently via its own controller. The NCU power system is referred to as the "slave" system and the existing power system as the "master" system. The Power Split feature controls the NCU power system's output voltage and rectifiers' current limit so that the "slave" power system shares the load with the "master" system.

Optional Functions: The NCU controller can mimic the equalize and battery test functions of the "master" system's controller. In addition, the NCU controller can mimic the low voltage load disconnect and/or low voltage battery disconnect functions of the "master" system. This is accomplished by supplying digital signals from the "master" system's controller to the NCU. This allows these functions to remain active in the "master" system.

OVERVIEW

See also "Power Split Feature" on page 6.

How Power Split Works

There are four User adjustable parameters for Power Split. They are:

- **Slave Current Limit Value:** Current limit point for power system designated as the slave system in a "Power Split" configuration.
- **Delta Voltage:** The offset voltage that the power system designated as the slave system in a "Power Split" configuration is set to. It is suggested to leave this value at the default (0.5 volts).

- **Proportion Coeff:** The proportional coefficient that the power system designated as the slave system in a "Power Split" configuration is set to. It is suggested to leave this value at the default (30%).
- **Integral Time:** The integral time that the power system designated as the slave system in a "Power Split" configuration is set to. It is suggested to leave this value at the default (60 seconds).

The NCU controller uses these parameters to control the load sharing operation between the two power systems.

Depending on the systems' configurations, their rectifier capacities, their distribution load capacities, and the Power Split configuration; four operating modes can occur.

Low Load Operation

When the total load current demand is lower than the SLAVE CURRENT LIMIT value, the NCU power system voltage will be increased by the programmed DELTA VOLTAGE setting forcing the NCU power system to carry the load. Make sure that the output voltage does not exceed the battery float range recommended by the manufacturer. In this operating mode, no current will be delivered by the existing power system.

Normal Load Operation

When the total load current demand reaches the SLAVE CURRENT LIMIT value, the NCU power system operates in output current limit and its output voltage will be decreased (up to the DELTA VOLTAGE setting) in order to regulate the current, allowing the existing power system to deliver the remaining current. Both the NCU power system and the existing power system are now providing current to the load.

High Load Operation

If current demand increases and the existing power system reaches its current limit setting, float voltage will again begin to decrease. When the voltage falls below the float setting minus the DELTA VOLTAGE setting, the NCU system will come out of current limit and now deliver the additional current necessary to satisfy the load. This operation may occur when the batteries are being recharged, such as after a commercial AC failure.

Over Load Operation

If the load current is greater than the combined current capacities of the NCU system and the existing power system, both power systems will go into current limit. Both systems and the batteries will feed the load. The output voltage will depend on the conditions of the batteries. This operation occurs if the total capacity of the rectifiers is too low in relation to the need for increased current.

Operating Modes

Figure 5 illustrates the four modes of operation described above.

The Normal Load Operation is considered to be the normal mode. In this mode both the NCU system and the existing parallel power system are both delivering load current. This is main purpose of using Power Split, to avoid putting the burden of delivering the entire load onto one of the two power systems.

Requirements and Conditions

The two DC power systems must be connected in parallel as described in "Paralleling the Existing and NCU Power Systems" on page 30.

Before paralleling the two systems, the following conditions must be met for proper Power Split function.

Note: *The control features of the combined system are limited to those of the original power system.*

Note: *The same type of batteries with an equal amount of cells and the same charging voltages must be used for both systems.*

- The float voltage, equalize voltage, and battery test voltage of the NCU power system must be set to the same levels as that of the existing power system.
- The remote sense, if available and connected, of both the NCU power system and existing power system must be connected to the same point.
- If batteries are used, they must be of the same type.
- All the functions specific to the existing power system and NCU power system and which depend on the voltage or which act on the voltage must be disabled from the existing power system and NCU power system. This includes the following...
  a. any equalization function,
  b. any temperature compensation function,
  c. any charge control function,
  d. any battery discharge test function, and
  e. any invalid current alarm.

In lieu of this, if battery charging and battery test functions are implemented in the existing power system, they can remain if signals for starting are connected from the control system of the existing system to the NCU system.

Paralleling the Existing and NCU Power Systems

Important Safety Instructions

General Safety

DANGER!
YOU MUST FOLLOW APPROVED SAFETY PROCEDURES.

Performing the following procedures may expose you to hazards. These procedures should be performed by qualified technicians familiar with the hazards associated with this type of equipment. These hazards may include shock, energy, and/or burns. To avoid these hazards:

a) The tasks should be performed in the order indicated.

b) Remove watches, rings, and other metal objects.

c) Prior to contacting any uninsulated surface or termination, use a voltmeter to verify that no voltage or the expected voltage is present. Check for voltage with both AC and DC voltmeters prior to making contact.

d) Wear eye protection.

e) Use certified and well maintained insulated tools. Use double insulated tools appropriately rated for the work to be performed.

AC Input Voltages

DANGER! This system operates from AC input voltage capable of producing fatal electrical shock.

DC Output and Battery Voltages

DANGER! Connecting the NCU power system to an existing power system for "Power Split" mode involves working on live equipment carrying live loads. This system produces DC Power and may have a battery source connected to it. Although the DC voltage is not hazardously high, the rectifiers and/or battery can deliver large amounts of current. Exercise extreme caution not to inadvertently contact or have any tool inadvertently contact an output terminal or battery terminal or exposed wire connected to an output terminal or battery terminal. NEVER allow a metal object, such as a tool, to contact more than one termination or battery terminal at a time, or to simultaneously contact a termination or battery terminal and a grounded object. Even a momentary short circuit can cause sparking, explosion, and injury. Remove watches, rings, or other jewelry before connecting leads. Cover any live busbars with a canvas sheet to prevent short circuits caused by falling tools or parts.

Preparing the Existing and NCU Power Systems

- Install and turn-up the NCU power system as describe in the installation instructions furnished with the power system.
- Set the float voltage on both the existing and NCU power systems to the same level. Temperature compensation functionality, if used, should be disabled on both power systems.

Paralleling the Systems

- Connect the Battery and Battery Return busbars of the NCU Power System to the main charge busbars (rectifier side of the shunt) on the parallel power system. Size the cable for the largest current between systems.

  Note 1: *The connections between the two power systems should be done with power cables appropriately sized to be capable of carrying the maximum current that can circulate between the two power systems.*

  Note 2: *If the parallel power system incorporates a main plant shunt, the connections of the cables from the NCU power system to the parallel power system shall be made on the main charge busbars (rectifier side of the shunt).*

Note 3: *To compensate for voltage drop, it is recommended to connect the NCU power system's remote sense leads (if available) to the same point of sensing as the parallel power system.*

Note 4: *There shall be only one battery return reference (BRR) cable for the two power systems. If the cable is appropriately sized on the parallel power system, keep it as the BRR for both power systems. If the cable is not appropriately sized on the parallel power system, install a new BRR cable and connect it preferably to the NCU power system since the parallel power system may eventually be phased out.*

Note 5: *If battery disconnect units (BDUs) are used on the new or parallel power system, these shall be wired in such a way as to be all triggered simultaneously in order to prevent any overloading of these.*

Note 6: *For the size and number of bridge cables between the two power systems, take into consideration the voltage drop, the available connecting points in each system, as well as the fact that these cables are unfused and shall therefore be run on a dedicated cable rack. "C" or "H" taps may be used to make full use of available connecting points.*

Note 7: *The legacy system retains the function of its controller and the percent of load on each plant is controlled by the NCU. Alarms may be sent individually from each plant, or combined using an NCU Interface Board and the programmable relays resident in the controller.*

Note 8: *Add a label on both power systems to indicate that these are operating in the Power Split Mode with each other.*

- **Optional Function Connections:** The following signals from the existing system must be connected to digital inputs of the NCU system interface board for these functions to be active: Equalize Charge in Progress, Battery Test in Progress, Load LVD Active, and Battery LVD Active. Otherwise disable these functions.

Programming the NCU Power Split Feature

After an NCU power system has been connected to an existing power system and both systems set for the same float voltage, you will have to configure the Power Split parameters in the NCU.

Procedure

1. In the Web Interface menus, set the Power Split mode to slave. Navigate to Settings Menu / System / Power System / PowerSplit Mode. Set this parameter to "Slave".
2. Reboot the NCU by pressing ESC and ENT at the same time.
3. Navigate to Settings Menu / System / Power System.
4. Set the "Slave Current Limit Value" to a value that will force the NCU system's rectifiers to operate in current limiting mode.

Note: *The Slave Current Limit must be set lower than the total distribution current from the two plants. The default value is 60% of the NCU power system's rectifier capacity.*

5. Set the "Delta Voltage". This voltage is by default set to 0.5 V but can be readjusted.
    - If the distribution current is lower than 50% of the total capacity of the NCU power system, the "Delta Voltage" can be adjusted to a lower level than 0.5 V to get a system voltage that is closer to the desired float charging voltage.
    - If the voltage drop between the existing system and the NCU system is expected to be >0.5 V, the "Delta Voltage" can be adjusted to a higher level than 0.5 V to get a correct split function.
    - Temperature controlled battery charging cannot be set in the NCU power system in power split mode. If this function is implemented in the existing power system, a limited function within a temperature range of approximately ±15 °C will be achieved if the Delta Voltage is set to a higher level, maximum 2.00 V.
    - If the "Delta Voltage" 0.5 V is considered to be too high, the split function can be tested at various modes of operation to find a lower setting.

Optional Function Setup

Equalize Charge Setup

If the equalize charge function is to be used, equalize charge must be implemented in the existing power system and an equalizing signal from its control unit must be connected to the NCU.

1. In the Web Interface menus, navigate to Settings Menu / Battery / Equalize Charge Voltage. Set the "Equalize

Charge Voltage" to the same value as the equalize voltage of the existing power system.

2. Using the Web Interface menus (see "Power Split Tab" on page 147), select the NCU digital input connected to the existing systems equalize control circuit.

Note: *Equalize charging is controlled by the existing power system via an incoming digital signal. The system will remain at the set equalize charge voltage level as long as this signal is active.*

Battery Test Setup

If the battery test function is to be used, battery test must be implemented in the existing power system and a test signal from its control unit must be connected to the NCU.

1. In the Web Interface menus, navigate to Settings Menu / Battery Test.
2. Set the "End Test Voltage" to the same value as the end voltage of the existing power system.
3. Set the "Test Voltage Level" to the same value as the test voltage of the existing power system.
4. Using the Web Interface menus (see "Power Split Tab" on page 147), select the NCU digital input connected to the existing systems battery test control circuit.

Note: *Other settings in this menu regarding "Battery Test" are inactive.*

Note: *Battery test is controlled by the existing power system via an incoming digital signal. The system will remain at battery test as long as this signal is active.*

Low Voltage Disconnect Setup

If low voltage disconnect functions are to be used, they must be implemented in the existing power system and signals from its control unit must be connected to the NCU.

1. Using the Web Interface menus (see "Power Split Tab" on page 147), select the NCU digital inputs connected to the low voltage disconnect control circuits.

Temperature Compensated Battery Charge

There is no possibility to activate the "Temperature Compensated Battery Charge" function when the NCU power system is configured for "Power Split" mode.

However, the possibility to change the "Delta Voltage" enables the NCU power system to follow the existing power system that has the functionality to a certain limit.

Example: The "Delta Voltage" in the NCU power system is set to 1.0V. The existing power system is set to compensate 3.0 mV/cell/°C. This means that the NCU power system can follow the temperature compensation of the existing; power system in the range of ±14 °C from the set normal battery temperature (3.0 mV x 24 cells x 14 °C = 1.008 V).

Verifying the Operation of the Power Split Feature

After programming the "Power Split" feature, verify its operation as follows.

1. In a Power Split application where the NCU power system is taking the entire load and the rectifiers in the existing power system are all in the standby mode, use an external dry load bank of sufficient capacity to increase the load on the NCU power system over the "SLAVE CURRENT LIMIT" value.
   a. Verify that the NCU power system limits the total output of its rectifiers to the current equivalent to this programmed percentage.
   b. Verify that the NCU power system lowers its output voltage by the value of the programmed "DELTA VOLTAGE".
   c. Verify that the rectifiers in the existing power system take the additional load as the load increases pass the "SLAVE CURRENT LIMIT" value.
   d. Further increase the load in order to exceed the total capacity of the rectifiers in the existing power system (or shut down some of the rectifiers in the existing power system if the capacity of the external dry load bank is not sufficient). Verify that the NCU power system starts taking the additional load as soon as the total capacity of the rectifiers in the existing power system is exceeded.
2. In a Power Split application where the NCU power system is taking only part of the load (operating continuously at the current level equivalent to the programmed "SLAVE CURRENT LIMIT" percentage) and the rectifiers in the existing power system are taking the rest of the load, use an external dry load bank of sufficient capacity to increase the load in order to exceed the total capacity of the rectifiers in the existing power system (or shut down some of the rectifiers in the existing power system if the capacity of the external dry load bank is not sufficient).
   a. Verify that the NCU power system starts taking the additional load as soon as the total capacity of the rectifiers in the existing power system is exceeded.

Resolving Alarms

Table 5 lists the alarms that are shown in the Web Interface Advance Settings Menu under the Alarms Tab. These are also the possible alarms that display in the alarm screens on the LCD Interface and Web Interface. Table 5 also provides guidelines for fixing the condition that caused the alarm.

Note: *These instructions describe the complete functionality of the controller. Some functionality is dependent on hardware connected to the controller. Some alarms listed may not display in your system or may be named differently. Refer to the NCU Configuration Drawing (C-drawing) furnished with your system.*

Refer also to the NCU Configuration Drawing (C-drawing) furnished with your system for the factory default "Alarm Severity Level" settings and "Alarm Relay" mapping to the available alarms.

Table 5. Available Alarms

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Power System Alarms (Power System)		
Supervision Unit Fail (SelfDetect Fail)	Controller self-detection test fails.	Replace the controller.
CAN Communication Failure (CAN Comm Fail)	CAN bus communications failure.	Check communications cables.
Outgoing Alarms Blocked (Alarm Blocked)	Alarm relays are forced in the "off" state and alarms are blocked from changing the relay state.	Verify why controller setting was changed before changing back.
Maintenance Time Limit Alarm (Mtnc Time Alarm)	Controller issues a maintenance alarm.	Perform routine maintenance and reset maintenance timer.
Config Error (Backup Config) (Config Error 1)	Configuration error 1.	Reload configuration package.
Config Error (Default Config) (Config Error 2)	Configuration error 2.	
Imbalance System Current (Imbalance Curr)	Current sharing imbalance.	Check why current sharing is imbalanced.
Over Load (Over Load)	Output overload condition.	Check the load.
SPD (SPD)	Surge protection device needs attention.	Check surge protection device.
EStop/EShutdown (EStop/EShutdown)	System in emergency stop or emergency shutdown mode.	Check why the system was placed in this mode.
System Temp 1 Not Used (System T1 Not U)	Temperature sensor port #1 is not used.	--
System Temp 2 Not Used (System T2 Not U)	Temperature sensor port #2 is not used.	
System Temp 3 Not Used (System T3 Not U)	Temperature sensor port #3 is not used.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
IB2 Temp 1 Not Used (IB2 T1 Not Used)	Temperature sensor port #1 (on IB2 Board) is empty.	--
IB2 Temp 2 Not Used (IB2 T2 Not Used)	Temperature sensor port #2 (on IB2 Board) is empty.	
EIB Temp 1 Not Used (EIB T1 Not Used)	Temperature sensor port #1 (on EIB Board) is empty.	
EIB Temp 2 Not Used (EIB T2 Not Used)	Temperature sensor port #2 (on EIB Board) is empty.	
System Temp 1 Sensor Fail (System T1 Senso)	Temperature sensor #1 failure.	Replace temperature sensor.
System Temp 2 Sensor Fail (System T2 Senso)	Temperature sensor #2 failure.	
System Temp 3 Sensor Fail (System T3 Senso)	Temperature sensor #3 failure.	
IB2 Temp 1 Sensor Fail (IB2 T1 Sensor F)	Temperature sensor #1 (connected to IB2 Board) failure.	Replace temperature sensor.
IB2 Temp 2 Sensor Fail (IB2 T2 Sensor F)	Temperature sensor #2 (connected to IB2 Board) failure.	
EIB Temp 1 Sensor Fail (EIB T1 Sensor F)	Temperature sensor #1 (connected to EIB Board) failure.	
EIB Temp 2 Sensor Fail (EIB T2 Sensor F)	Temperature sensor #2 (connected to EIB Board) failure.	
DHCP Failure (DHCP Failure)	The DHCP function is enabled, but effective IP address cannot be acquired.	Verify DHCP IP address.
PLC Config Error (PLC Config Err)	PLC configuration error.	Re-enter the PLC logic functions.
485 Communication Failure (485 Comm Fail)	485 communications failure.	--
Minor Summary (MN Summary)	Minor alarm summary (one or more alarms designated as minor is active).	Check additional alarms.
Major Summary (MJ Summary)	Major alarm summary (one or more alarms designated as major is active).	Check additional alarms.
Critical Summary (CR Summary)	Critical alarm summary (one or more alarms designated as critical is active).	Check additional alarms.
Rectifier Group Lost (Rect Group Lost)	A rectifier group cannot be detected by the controller.	Check communications cables. Check additional alarms.
Over Voltage 1 (Over Voltage 1)	Output voltage is higher than the Over Voltage 1 Alarm threshold.	Check why system voltage is high. Check the alarm setting.
Over Voltage 2 (Over Voltage 2)	Output voltage is higher than the Over Voltage 2 Alarm threshold.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Under Voltage 1 (Under Voltage 1)	Output voltage is lower than the Under Voltage 1 Alarm threshold.	Check why system voltage is low. If there is a mains failure, check if some load could be switched off in order to prolong the operating time of the plant. If the system load is too high related to rectifier capacity, install additional rectifiers. If the batteries are being recharged, the alarm will cease by itself when battery voltage has increased to the charging level.
Under Voltage 2 (Under Voltage 2)	Output voltage is lower than the Under Voltage 2 Alarm threshold.	
Over Voltage 1 (24V) (24V Over Volt1)	Output voltage is higher than the Over Voltage 1 Alarm threshold.	Check why system voltage is high. Check the alarm setting.
Over Voltage 2 (24V) (24V Over Volt2)	Output voltage is higher than the Over Voltage 2 Alarm threshold.	
Under Voltage 1 (24V) (24V Under Volt1)	Output voltage is lower than the Under Voltage 1 Alarm threshold.	Check why system voltage is low. If there is a mains failure, check if some load could be switched off in order to prolong the operating time of the plant. If the system load is too high related to rectifier capacity, install additional rectifiers. If the batteries are being recharged, the alarm will cease by itself when battery voltage has increased to the charging level.
Under Voltage 2 (24V) (24V Under Volt2)	Output voltage is lower than the Under Voltage 2 Alarm threshold.	
Diesel Run Over Temp (DG Run OverTemp)	Diesel generator run over temperature alarm.	Check diesel generator.
DG1 is Running (DG1 is Running)	Diesel generator 1 is running.	--
DG2 is Running (DG2 is Running)	Diesel generator 2 is running.	--
Hybrid is High Load (High Load)	Diesel generator high load alarm.	Check load on diesel generator.
DG1 Failure (DG1 Failure)	Diesel generator 1 has failed.	Check diesel generator.
DG2 Failure (DG2 Failure)	Diesel generator 2 has failed.	Check diesel generator.
Grid is on (Grid is on)	AC is on grid.	--
Ambient Temp High 1 (Amb Temp High1)	High diesel generator ambient temperature alarm1.	Check why temperature is high or low.
Ambient Temp Low (Amb Temp Low)	Low diesel generator ambient temperature alarm.	
Ambient Temp High 2 (Amb Temp High2)	High diesel generator ambient temperature alarm2.	
Ambient Sensor Fail (AmbSensor Fault)	Ambient temperature sensor failure.	Replace temperature sensor.

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
DI1 Alarm (DI1 Alarm)	Digital input #1 alarm is active.	Check why alarm is active.
...	...	
DI7 Alarm (DI7 Alarm)	Digital input #7 alarm is active.	
DI8 ESTOP (DI8 ESTOP)	Digital input #8 alarm is active.	
IB Communication Fail (IB Comm Fail)	NCU Interface Board communications failure.	Check communications cables.
Relay Test (Relay Test)	Relay Test in progress.	--
Relay 1 Test (Relay 1 Test)	Testing Relay 1 (on IB2 Board).	--
...	...	
Relay 8 Test (Relay 8 Test)	Testing Relay 8 (on IB2 Board).	
System Temp1 High 2 (System T1 Hi2)	Temperature sensor #1 sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
System Temp1 High 1 (System T1 Hi1)	Temperature sensor #1 sensing temperature higher than high temperature threshold 1.	
System Temp1 Low (System T1 Low)	Temperature sensor #1 sensing temperature lower than low temperature threshold.	
System Temp2 High 2 (System T2 Hi2)	Temperature sensor #2 sensing temperature higher than high temperature threshold 2.	
System Temp2 High 1 (System T2 Hi1)	Temperature sensor #2 sensing temperature higher than high temperature threshold 1.	
System Temp2 Low (System T2 Low)	Temperature sensor #2 sensing temperature lower than low temperature threshold.	
System Temp3 High 2 (System T3 Hi2)	Temperature sensor #3 sensing temperature higher than high temperature threshold 2.	
System Temp3 High 1 (System T3 Hi1)	Temperature sensor #3 sensing temperature higher than high temperature threshold 1.	
System Temp3 Low (System 31 Low)	Temperature sensor #3 sensing temperature lower than low temperature threshold.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
IB2 Temp1 High 2 (IB2 T1 Hi2)	Temperature sensor #1 (connected to IB2 board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
IB2 Temp1 High 1 (IB2 T1 Hi1)	Temperature sensor #1 (connected to IB2 board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
IB2 Temp1 Low (IB2 T1 Low)	Temperature sensor #1 (connected to IB2 board and set as Ambient) sensing temperature lower than low temperature threshold.	
IB2 Temp2 High 2 (IB2 T2 Hi2)	Temperature sensor #2 (connected to IB2 board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
IB2 Temp2 High 1 (IB2 T2 Hi1)	Temperature sensor #2 (connected to IB2 board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
IB2 Temp2 Low (IB2 T2 Low)	Temperature sensor #2 (connected to IB2 board and set as Ambient) sensing temperature lower than low temperature threshold.	
EIB Temp1 High 2 (EIB T1 Hi2)	Temperature sensor #1 (connected to EIB board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
EIB Temp1 High 1 (EIB T1 Hi1)	Temperature sensor #1 (connected to EIB board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
EIB Temp1 Low (EIB T1 Low)	Temperature sensor #1 (connected to EIB board and set as Ambient) sensing temperature lower than low temperature threshold.	
EIB Temp2 High 2 (EIB T2 Hi2)	Temperature sensor #2 (connected to EIB board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
EIB Temp2 High 1 (EIB T2 Hi1)	Temperature sensor #2 (connected to EIB board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
EIB Temp2 Low (EIB T2 Low)	Temperature sensor #2 (connected to EIB board and set as Ambient) sensing temperature lower than low temperature threshold.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
SMTemp1 Temp1 High 2 (SMTemp1 T1 Hi2)	Temperature sensor #1 (connected to SM-Temp 1 and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp1 Temp1 High 1 (SMTemp1 T1 Hi1)	Temperature sensor #1 (connected to SM-Temp 1 and set as Ambient) sensing temperature higher than high temperature threshold 1.	
SMTemp1 Temp1 Low (SMTemp1 T1 Low)	Temperature sensor #1 (connected to SM-Temp 1 and set as Ambient) sensing temperature lower than low temperature threshold.	
…	…	…
SMTemp1 Temp8 High 2 (SMTemp1 T8 Hi2)	Temperature sensor #8 (connected to SM-Temp 1 and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp1 Temp8 High 1 (SMTemp1 T8 Hi1)	Temperature sensor #8 (connected to SM-Temp 1 and set as Ambient) sensing temperature higher than high temperature threshold 1.	
SMTemp1 Temp8 Low (SMTemp1 T8 Low)	Temperature sensor #8 (connected to SM-Temp 1 and set as Ambient) sensing temperature lower than low temperature threshold.	
…	…	…
SMTemp8 Temp1 High 2 (SMTemp8 T1 Hi2)	Temperature sensor #1 (connected to SM-Temp 8 and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp8 Temp1 High 1 (SMTemp8 T1 Hi1)	Temperature sensor #1 (connected to SM-Temp 8 and set as Ambient) sensing temperature higher than high temperature threshold 1.	
SMTemp8 Temp1 Low (SMTemp8 T1 Low)	Temperature sensor #1 (connected to SM-Temp 8 and set as Ambient) sensing temperature lower than low temperature threshold.	
…	…	…

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
SMTemp8 Temp8 High 2 (SMTemp8 T8 Hi2)	Temperature sensor #8 (connected to SM-Temp 8 and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp8 Temp8 High 1 (SMTemp8 T8 Hi1)	Temperature sensor #8 (connected to SM-Temp 8 and set as Ambient) sensing temperature higher than high temperature threshold 1.	
SMTemp8 Temp8 Low (SMTemp8 T8 Low)	Temperature sensor #8 (connected to SM-Temp 8 and set as Ambient) sensing temperature lower than low temperature threshold.	
High Load Level 1 (HighLoadLevel1)	Load current above high level 1.	Check why load current is high.
High Load Level 2 (HighLoadLevel2)	Load current above high level 2.	
DI9 Alarm (DI9 Alarm)	Digital input #9 alarm is active.	Check why alarm is active.
...	...	
DI12 Alarm (DI12 Alarm)	Digital input #12 alarm is active.	
Relay 14 Test (Relay 14 Test)	Testing Relay 14.	--
...	...	
Relay 17 Test (Relay 17 Test)	Testing Relay 17.	
Over Maximum Power Alarm (Over Max Pw Alm)	Over maximum power alarm active.	Check why over maximum power alarm is active.
SMS Modem Fail (SMS Modem Fail)	SMS modem has failed.	Check why SMS modem failed.
Manual State (Manual State)	NCU in manual state.	--
System Current Alarm (System Current Alarm)	System current alarm active.	Check why system current alarm is active.
Rectifier Group Alarms (Rect Group)		
Multiple Rectifiers Fail (Multi-Rect Fail)	More than one rectifier has failed.	Check input voltage to rectifiers. Replace rectifiers.
Rectifier Lost (Rectifier Lost)	A rectifier cannot be detected by the controller.	Reset the Rectifier Lost alarm. Replace defective rectifier.
ECO Active (ECO Active)	Rectifier Energy Optimization Mode is enabled.	Check why system was placed into this mode.
All Rectifiers Comm Fail (AllRectCommFail)	No response from all rectifiers.	Check the connectors and cables or the CAN loop. Replace the controller.

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
ECO Cycle Alarm (ECO Cycle Alarm)	If Energy Optimization Mode is enabled and the controller oscillates in and out of Energy Optimization more than 5 times, this alarm is generated.	Check for other alarms. Reset this alarm.
Rectifier Alarms (Rectifier)		
AC Input Fail (AC Fail)	No AC input power to a rectifier.	Check why no AC input power available.
Rect Temperature High (Rect Temp High)	A rectifier has a high temperature condition.	Check why temperature is high.
Rectifier Fail (Rect Fail)	A rectifier has a fault condition.	Refer to Rectifier User Manual for troubleshooting information.
HVSD (HVSD)	A rectifier has an overvoltage condition.	
Rectifier Protected (Rect Protected)	A rectifier is in protected mode.	
Fan Fail (Fan Fail)	A rectifier's fan has failed.	Replace fan.
Current Limit (Current Limit)	A rectifier is in current limit.	Rectifier overload. The load is higher than rectifier capacity. If the batteries are being recharged, the alarm will cease by itself when the battery voltage has increased to the charging level. If the system load is higher than the rectifier capacity, the batteries will discharge. If this is the reason, install additional rectifiers. If one or more of the rectifiers are defective, replace the faulty rectifiers.
Rectifier Communication Fail (Rect Comm Fail)	A rectifier has lost communications with the controller.	Check communications cables. Reset the Communication Fail alarm. Replace the rectifier.
Derated (Derated)	A rectifier is in output power derating mode.	Refer to Rectifier User Manual for troubleshooting information.
Current Share Alarm (Curr Share Alm)	A rectifier has a current sharing alarm.	
AC Under Voltage Protection (Low AC Protect)	A rectifier is in under voltage protection mode.	
Battery Group Alarms (Battery Group)		
Short Battery Test Running (ShortBatTestRun)	Battery is in short time test mode.	--
Equalize for Test (EQ for Test)	Battery is in equalize charge test mode.	--

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Manual Test (Manual Test)	Battery is in manual battery discharge test mode.	--
Planned Test (Planned Test)	Battery is in planned battery test mode.	--
AC Fail Test (AC Fail Test)	AC power has been switched off to the rectifiers to perform a battery discharge test.	--
Manual Equalize (Manual EQ)	Battery is in manual equalize charging mode.	--
Automatic Equalize (Auto EQ)	Battery is in automatic equalize charging mode.	--
Cyclic Equalize (Cyclic EQ)	Battery is in cyclic equalize charging mode.	--
Master Equalize (Master EQ)	In slave mode, the slave unit starts equalize charging with the master unit.	--
Master Battery Test (Master Bat Test)	In slave mode, the slave unit starts the test with the master unit.	--
Discharge Current Imbalance (Dsch Curr Imb)	Battery distribution current imbalance alarm.	The currents from two groups of batteries are not equal. Check the batteries.
Abnormal Battery Current (Abnl Batt Curr)	The equalize charging current exceeds the alarm setting.	Check the alarm setting.
Temperature Compensation Active (TempComp Active)	Battery charge temperature compensation is active.	--
Battery Current Limit Active (Batt Curr Limit)	Battery is in current limit.	--
Bad Battery (Bad Battery)	Battery test fails.	Check the batteries.
Battery Discharge (Battery Disch)	Battery is discharging.	A battery test is active (the discharge test will stop automatically). There is a mains failure (check that it is not caused by open AC input circuit breaker). The system load is higher than rectifier capacity, causing the batteries to discharge (install additional rectifiers).

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Battery Test Fail (BatteryTestFail)	Battery test fails.	Check the batteries.
Comp Temp High2 (Comp Temp High2)	Compensation temperature sensor sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
Comp Temp High1 (Comp Temp High1)	Compensation temperature sensor sensing temperature higher than high temperature threshold 1.	
Comp Temp Low (Comp Temp Low)	Compensation temperature sensor sensing temperature lower than low temperature threshold.	
Compensation Sensor Fault (CompTempFail)	Temperature Compensation temperature sensor failure.	Replace temperature sensor.
System Temp1 High 2 (System T1 Hi2)	Temperature sensor #1 sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
System Temp1 High 1 (System T1 Hi1)	Temperature sensor #1 sensing temperature higher than high temperature threshold 1.	
System Temp1 Low (System T1 Low)	Temperature sensor #1 sensing temperature lower than low temperature threshold.	
System Temp2 High 2 (System T2 Hi2)	Temperature sensor #2 sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
System Temp2 High 1 (System T2 Hi1)	Temperature sensor #2 sensing temperature higher than high temperature threshold 1.	
System Temp2 Low (System T2 Low)	Temperature sensor #2 sensing temperature lower than low temperature threshold.	
System Temp3 High 2 (System T3 Hi2)	Temperature sensor #3 sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
System Temp3 High 1 (System T3 Hi1)	Temperature sensor #3 sensing temperature higher than high temperature threshold 1.	
System Temp3 Low (System T3 Low)	Temperature sensor #3 sensing temperature lower than low temperature threshold.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
IB2 Temp1 High 2 (IB2 T1 Hi2)	Temperature sensor #1 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
IB2 Temp1 High 1 (IB2 T1 Hi1)	Temperature sensor #1 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 1.	
IB2 Temp1 Low (IB2 T1 Low)	Temperature sensor #1 (connected to IB2 board and set as Battery) sensing temperature lower than low temperature threshold.	
IB2 Temp2 High 2 (IB2 T2 Hi2)	Temperature sensor #2 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
IB2 Temp2 High 1 (IB2 T2 Hi1)	Temperature sensor #2 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 1.	
IB2 Temp2 Low (IB2 T2 Low)	Temperature sensor #2 (connected to IB2 board and set as Battery) sensing temperature lower than low temperature threshold.	
EIB Temp1 High 2 (EIB T1 Hi2)	Temperature sensor #1 (connected to EIB board and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
EIB Temp1 High 1 (EIB T1 Hi1)	Temperature sensor #1 (connected to EIB board and set as Battery) sensing temperature higher than high temperature threshold 1.	
EIB Temp1 Low (EIB T1 Low)	Temperature sensor #1 (connected to EIB board and set as Battery) sensing temperature lower than low temperature threshold.	
EIB Temp2 High 2 (EIB T2 Hi2)	Temperature sensor #2 (connected to EIB board and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
EIB Temp2 High 1 (EIB T2 Hi1)	Temperature sensor #2 (connected to EIB board and set as Battery) sensing temperature higher than high temperature threshold 1.	
EIB Temp2 Low (EIB T2 Low)	Temperature sensor #2 (connected to EIB board and set as Battery) sensing temperature lower than low temperature threshold.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
SMTemp1 Temp1 High 2 (SMTemp1 T1 Hi2)	Temperature sensor #1 (connected to SM-Temp 1 and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp1 Temp1 High 1 (SMTemp1 T1 Hi1)	Temperature sensor #1 (connected to SM-Temp 1 and set as Battery) sensing temperature higher than high temperature threshold 1.	
SMTemp1 Temp1 Low (SMTemp1 T1 Low)	Temperature sensor #1 (connected to SM-Temp 1 and set as Battery) sensing temperature lower than low temperature threshold.	
...	...	...
SMTemp1 Temp8 High 2 (SMTemp1 T8 Hi2)	Temperature sensor #8 (connected to SM-Temp 1 and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp1 Temp8 High 1 (SMTemp1 T8 Hi1)	Temperature sensor #8 (connected to SM-Temp 1 and set as Battery) sensing temperature higher than high temperature threshold 1.	
SMTemp1 Temp8 Low (SMTemp1 T8 Low)	Temperature sensor #8 (connected to SM-Temp 1 and set as Battery) sensing temperature lower than low temperature threshold.	
...	...	...
SMTemp8 Temp1 High 2 (SMTemp8 T1 Hi2)	Temperature sensor #1 (connected to SM-Temp 8 and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp8 Temp1 High 1 (SMTemp8 T1 Hi1)	Temperature sensor #1 (connected to SM-Temp 8 and set as Battery) sensing temperature higher than high temperature threshold 1.	
SMTemp8 Temp1 Low (SMTemp8 T1 Low)	Temperature sensor #1 (connected to SM-Temp 8 and set as Battery) sensing temperature lower than low temperature threshold.	
...	...	...

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
SMTemp8 Temp8 High 2 (SMTemp8 T8 Hi2)	Temperature sensor #8 (connected to SM-Temp 8 and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp8 Temp8 High 1 (SMTemp8 T8 Hi1)	Temperature sensor #8 (connected to SM-Temp 8 and set as Battery) sensing temperature higher than high temperature threshold 1.	
SMTemp8 Temp8 Low (SMTemp8 T8 Low)	Temperature sensor #8 (connected to SM-Temp 8 and set as Battery) sensing temperature lower than low temperature threshold.	
BTRM Temp High 2 (BTRM Temp High2)	Battery temperature (monitored by the sensor set as BTRM) is higher than the BTRM Temperature Alarm 2 threshold.	Check why temperature is high or low.
BTRM Temp High 1 (BTRM Temp High1)	Battery temperature (monitored by the sensor set as BTRM) is higher than the BTRM Temperature Alarm 1 threshold.	
BTRM Sensor Fail (BTRM Sensor Fail)	BTRM temperature sensor failure.	Replace temperature sensor.
Inventory Update In Process (InventUpdating)	Li-Ion Battery inventory being updated.	--
ABCL is active (ABCL Active)	Active Battery Charge Current Limit is active.	--
Battery Charge Prohibited Alarm	A battery charge prohibited alarm is active.	See why alarm is active.
Battery Alarms (Battery)		
Battery Current Limit Exceeded (Ov Batt Cur Lmt)	Battery current limit point is exceeded.	--
Battery Over Current (Batt Over Curr)	Battery is in over current.	--
Low Battery Capacity (Low Batt Cap)	Battery has low capacity.	Check the batteries.
SMDU Battery Alarms (SM-DU Module must be present in system) (SMDU Battery)		
Exceed Current Limit (Exceed Curr Lmt)	Battery current limit point is exceeded.	--
Over Battery Current (Over Current)	Battery is in over current.	--
Low Capacity (Low Capacity)	Battery has low capacity.	Check the batteries.

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
EIB (Extended Interface Board) Battery Alarms (EIB Board must be present in system) (EIB Battery)		
Battery Current Limit Exceeded (Ov Bat Curr Lmt)	Battery current limit point is exceeded.	--
Battery Over Current (Bat Over Curr)	Battery is in over current.	--
Battery Low Capacity (Low Batt Cap)	Battery has low capacity.	Check the batteries.
SM Battery Alarms (SM-BAT Module must be present in system) (SM Battery)		
Current Limit Exceeded (Exceed Curr Lmt)	Battery is in over current.	--
Over Battery Current (Over Batt Curr)	Battery current is high.	--
Battery Leakage (Battery Leakage)	Battery has leakage current.	Check the batteries.
Low Acid Level (Low Acid Level)	Battery has low acid level.	Check the batteries.
Battery Disconnected (Batt Disconnec)	Battery disconnection is active.	--
High Battery Temperature (High Batt Temp)	Battery has high temperature condition.	--
Low Battery Temperature (Low Batt Temp)	Battery has low temperature condition.	--
Cell Voltage Difference (Cell Volt Diff)	Battery cell voltage difference detected.	Check the batteries.
SM-BAT Unit Failure (SM Unit Fail)	Battery monitoring device has failed.	Replace device.
Battery Temperature Sensor Failure (T Sensor Fault)	Battery temperature sensor has failed.	Replace temperature sensor.
Low Capacity (Low Capacity)	Battery has low capacity.	Check the batteries.
Battery Not Responding (Batt Comm Fail)	Battery monitoring device has lost communications with the controller.	Check communications cables.
Temperature Sensor not Used (Bat Temp No Use)	No battery temperature sensor.	--
LargeDU Battery Alarms (Large Distribution Unit must be present in system) (LargeDU Batt)		
Current Limit Exceeded (Exceed Curr Lmt)	Battery current limit point is exceeded.	--
Low Capacity (Low Capacity)	Battery has low capacity.	Check the batteries.

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Battery Fuse Failure (Batt Fuse Fail)	Battery fuse is open.	--
Battery Overvoltage (Batt Over Volt)	Battery has over voltage condition.	--
Battery Undervoltage (Batt Under Volt)	Battery has under voltage condition.	--
Battery Overcurrent (Batt Over Curr)	Battery has over current condition.	--
No Response (Comm Fail)	Battery monitoring device has lost communications with the controller.	Check communications cables.
SMBRC Battery Alarms (SM-BRC Module must be present in system) (SMBRC Battery)		
Low Cell Voltage Alarm (Low Volt Alm)	Battery string low voltage alarm.	--
Low Cell Temperature Alarm (Low Temp Alm)	Battery string low temperature alarm.	--
Low Cell Resistance Alarm (Low Resist Alm)	Battery string low resistance alarm.	--
Low Inter Cell Resistance Alarm (Low Inter Alm)	Battery string inter-cell low resistance alarm.	--
Low Ambient Temperature Alarm (Low Amb Alm)	Battery string ambient low alarm.	--
High Total Voltage (Overall Volt Hi)	Battery string high voltage alarm.	--
Low Total Voltage (Overall Volt Lo)	Battery string low voltage alarm.	--
High String Current (Hi String Curr)	Battery string high current alarm.	--
Low String Current (Lo String Curr)	Battery string low current alarm.	--
High Ripple Current Hi (Ripple Curr)	Battery string ripple current high.	--
Low Ripple Current (Lo Ripple Curr)	Battery string ripple current low.	--
Current Limit Exceeded (Exceed Curr Lmt)	Battery string current limit exceeded.	--
Over Battery Current (Over Current)	Battery string over current alarm.	--
Low Capacity (Low Capacity)	Battery string low capacity alarm.	--
High Cell Voltage Alarm (Cell HiVolt Alm)	Battery cell high voltage alarm.	--
High Cell Temperature Alarm (Cell HiTemp Alm)	Battery cell high temperature alarm.	--

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
High Cell Resistance Alarm (Cell HiRes Alm)	Battery cell high resistance alarm.	--
High Inter Cell Resist Alarm (Inter HiRes Alm)	Battery inter-cell high resistance alarm.	--
High Delta Cell vs Ambient Temp (Cell HiAmb Alm)	Battery cell high ambient temperature alarm.	--
Battery Block 1 Temperature Probe Failure	Battery temperature sensor has failed.	Replace temperature sensor.
...		
Battery Block 8 Temperature Probe Failure		
Temperature 9 Not Used (Temp9 Not Used)	Temperature sensor #9 not used.	--
...	...	
Temperature 24 Not Used (Temp24 Not Used)	Temperature sensor #24 not used.	
Battery Fuse Alarms (Batt Fuse)		
Fuse 1 Alarm (Fuse 1 Alarm)	Fuse #1 is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
...	...	
Fuse 6 Alarm (Fuse 6 Alarm)	Fuse #6 is open.	
SMDU Battery Fuse Unit Alarms (SM-DU Module must be present in system) (SMDU Bat Fuse)		
Batt Fuse 1 Alarm (Batt Fuse 1 Alm)	Battery fuse #1 is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
...	...	
Batt Fuse 6 Alarm (Batt Fuse 6 Alm)	Battery fuse #4 is open.	
DC Distribution Alarms (DC Distr)		
Over Voltage 1 (Over Voltage 1)	DC output is above over voltage 1 threshold.	Check why voltage is high.
Over Voltage 2 (Over Voltage 2)	DC output is above over voltage 2 threshold.	
Under Voltage 1 (Under Voltage 1)	DC output is below under voltage 1 threshold.	Check why voltage is low.
Under Voltage 2 (Under Voltage 2)	DC output is below under voltage 2 threshold.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Over Voltage 1 (24V) (24V Over Volt1)	DC output is above over voltage 1 threshold.	Check why voltage is high.
Over Voltage 2 (24V) (24V Over Volt2)	DC output is above over voltage 2 threshold.	
Under Voltage 1 (24V) (24V Under Volt1)	DC output is below under voltage 1 threshold.	Check why voltage is low.
Under Voltage 2 (24V) (24V Under Volt2)	DC output is below under voltage 2 threshold.	
DC Fuse Unit Alarms (DC Fuse Unit)		
Fuse 1 Alarm (Fuse 1 Alarm)	DC output fuse #1 is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
...	...	
Fuse 12 Alarm (Fuse 12 Alarm)	DC output fuse #12 is open.	
SMDU DC Fuse Alarms (SM-DU Module must be present in system) (SMDU DC Fuse)		
Fuse 1 Alarm (DC Fuse 1 Alm)	DC output fuse #1 is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
...	...	
Fuse 16 Alarm (DC Fuse 16 Alm)	DC output fuse #16 is open.	
SMDUP1 [2, 3, 4, 5, 6, 7, 8] DC Fuse Alarms (SM-DU+ Module must be present in system) (SMDUP1 [2, 3, 4, 5, 6, 7, 8] DC Fuse)		
Fuse 1 Alarm (DC Fuse 1 Alm)	DC output fuse #1 is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
...	...	
Fuse 25 Alarm (DC Fuse 25 Alm)	DC output fuse #25 is open.	
LVD Unit Alarms (Low voltage disconnect must be present in system) (LVD Unit)		
LVD 1 Disconnect (LVD 1 Disconnect)	LVD1 contactor is in disconnect mode.	--
LVD 2 Disconnect (LVD 2 Disconnect)	LVD2 contactor is in disconnect mode.	--
LVD 1 Fail (LVD 1 Fail)	LVD1 contactor has failed.	Check the contactor functions. Replace the contactor.
LVD 2 Fail (LVD 2 Fail)	LVD2 contactor has failed.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
SMDU LVD Alarms (SM-DU Module must be present in system) (SMDU LVD)		
LVD 1 Disconnect (LVD 1 Disconnect)	LVD1 contactor is in disconnect mode.	--
LVD 2 Disconnect (LVD 2 Disconnect)	LVD2 contactor is in disconnect mode.	--
LVD 1 Contactor Fail (LVD 1 Fail)	LVD1 contactor has failed.	Check the contactor functions. Replace the contactor.
LVD 2 Contactor Fail (LVD 2 Fail)	LVD2 contactor has failed.	
LVD3 Unit Alarms (LVD3 Unit)		
LVD 3 Disconnect (LVD 3 Disconnect)	LVD3 contactor is in disconnect mode.	--
LVD 3 Fail (LVD 3 Fail)	LVD3 contactor has failed.	Check the contactor functions. Replace the contactor.
Large DU LVD Alarms (Large Distribution Unit must be present in system) (Large DU LVD)		
LVD1 Disconnected (LVD1 Disconnect)	LVD1 contactor is in disconnect mode.	--
LVD2 Disconnected (LVD2 Disconnect)	LVD2 contactor is in disconnect mode.	--
Rectifier AC Alarms (Rectifier AC)		
Line AB Over Voltage 1 (L-AB Over Volt1)	Voltage between Line A and Line B is higher than the High Line Voltage AB Alarm threshold.	Check why voltage is high.
Line AB Over Voltage 2 (L-AB Over Volt2)	Voltage between Line A and Line B is higher than the Very High Line Voltage AB Alarm threshold.	
Line AB Under Voltage 1 (L-AB UnderVolt1)	Voltage between Line A and Line B is lower than the Low Line Voltage AB Alarm threshold.	Check why voltage is low.
Line AB Under Voltage 2 (L-AB UnderVolt2)	Voltage between Line A and Line B is lower than the Very Low Line Voltage AB Alarm threshold.	
Line BC Over Voltage 1 (L-BC Over Volt1)	Voltage between Line B and Line C is higher than the High Line Voltage BC Alarm threshold.	Check why voltage is high.
Line BC Over Voltage 2 (L-BC Over Volt2)	Voltage between Line B and Line C is higher than the Very High Line Voltage BC Alarm threshold.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Line BC Under Voltage 1 (L-BC UnderVolt1)	Voltage between Line B and Line C is lower than the Low Line Voltage BC Alarm threshold.	Check why voltage is low.
Line BC Under Voltage 2 (L-BC UnderVolt2)	Voltage between Line B and Line C is lower than the Very Low Line Voltage BC Alarm threshold.	
Line CA Over Voltage 1 (L-CA Over Volt1)	Voltage between Line C and Line A is higher than the High Line Voltage CA Alarm threshold.	Check why voltage is high.
Line CA Over Voltage 2 (L-CA Over Volt2)	Voltage between Line C and Line A is higher than the Very High Line Voltage CA Alarm threshold.	
Line CA Under Voltage 1 (L-CA UnderVolt1)	Voltage between Line C and Line A is lower than the Low Line Voltage CA Alarm threshold.	Check why voltage is low.
Line CA Under Voltage 2 (L-CA UnderVolt2)	Voltage between Line C and Line A is lower than the Very Low Line Voltage CA Alarm threshold.	
AC1 Over Voltage 1 (AC1 Over Volt 1)	AC1 voltage is above over voltage 1 threshold.	Check why voltage is high.
AC1 Over Voltage 2 (AC1 Over Volt 2)	AC1 voltage is above over voltage 2 threshold.	
AC1 Under Voltage 1 (AC1 Under Volt 1)	AC1 voltage is below under voltage 1 threshold.	Check why voltage is low.
AC1 Under Voltage 2 (AC1 Under Volt 2)	AC1 voltage is below under voltage 2 threshold.	
AC2 Over Voltage 1 (AC2 Over Volt 1)	AC2 voltage is above over voltage 1 threshold.	Check why voltage is high.
AC2 Over Voltage 2 (AC2 Over Volt 2)	AC2 voltage is above over voltage 2 threshold.	
AC2 Under Voltage 1 (AC2 Under Volt 1)	AC2 voltage is below under voltage 1 threshold.	Check why voltage is low.
AC2 Under Voltage 2 (AC2 Under Volt 2)	AC2 voltage is below under voltage 2 threshold.	
AC3 Over Voltage 1 (AC3 Over Volt 1)	AC3 voltage is above over voltage 1 threshold.	Check why voltage is high.
AC3 Over Voltage 2 (AC3 Over Volt 2)	AC3 voltage is above over voltage 2 threshold.	
AC3 Under Voltage 1 (AC3 Under Volt 1)	AC3 voltage is below under voltage 1 threshold.	Check why voltage is low.
AC3 Under Voltage 2 (AC3 Under Volt 2)	AC3 voltage is below under voltage 2 threshold.	
Mains Failure (Mains Failure)	Commercial AC power failure.	Check why no commercial AC power.

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
OB AC Unit (OB-AC Module must be present in system) (OBAC)		
Phase A Over Voltage 1 (PH-A Over Volt1)	Phase A voltage is above over voltage 1 threshold.	Check why voltage is high.
Phase A Over Voltage 2 (PH-A Over Volt2)	Phase A voltage is above over voltage 2 threshold.	
Phase A Under Voltage 1 (PH-A UnderVolt1)	Phase A voltage is below under voltage 1 threshold.	Check why voltage is low.
Phase A Under Voltage 2 (PH-A UnderVolt2)	Phase A voltage is below under voltage 2 threshold.	
Phase B Over Voltage 1 (PH-B Over Volt1)	Phase B voltage is above over voltage 1 threshold.	Check why voltage is high.
Phase B Over Voltage 2 (PH-B Over Volt2)	Phase B voltage is above over voltage 2 threshold.	
Phase B Under Voltage 1 (PH-B UnderVolt1)	Phase B voltage is below under voltage 1 threshold.	Check why voltage is low.
Phase B Under Voltage 2 (PH-B UnderVolt2)	Phase B voltage is below under voltage 2 threshold.	
Phase C Over Voltage 1 (PH-C Over Volt1)	Phase C voltage is above over voltage 1 threshold.	Check why voltage is high.
Phase C Over Voltage 2 (PH-C Over Volt2)	Phase C voltage is above over voltage 2 threshold.	
Phase C Under Voltage 1 (PH-C UnderVolt1)	Phase C voltage is below under voltage 1 threshold.	Check why voltage is low.
Phase C Under Voltage 2 (PH-C UnderVolt2)	Phase C voltage is below under voltage 2 threshold.	
Mains Failure (Mains Failure)	Commercial AC power failure.	Check why no commercial AC power.
Severe Mains Failure (SevereMainsFail)	Commercial AC power voltage is too low.	Check why voltage is low.
Mains Failure (Single) (Mains Failure)	Commercial AC power failure.	Check why no commercial AC power.
Severe Mains Failure (Single) (SevereMainsFail)	Commercial AC power voltage is too low.	Check why voltage is low.
SMAC Alarms (SM-AC Module must be present in system) (SMAC)		
Supervision Fail (Supervise Fail)	AC monitoring device has failed.	--
High Line Voltage AB (Hi LineVolt AB)	Voltage between Line A and Line B above high voltage threshold.	Check why voltage is high.
Very High Line Voltage AB (VHi LineVolt AB)	Voltage between Line A and Line B above very high voltage threshold.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Low Line Voltage AB (Lo LineVolt AB)	Voltage between Line A and Line B below low voltage threshold.	Check why voltage is low.
Very Low Line Voltage AB (VLo LineVolt AB)	Voltage between Line A and Line B below very low voltage threshold.	
High Line Voltage BC (Hi LineVolt BC)	Voltage between Line B and Line C above high voltage threshold.	Check why voltage is high.
Very High Line Voltage BC (VHi LineVolt BC)	Voltage between Line B and Line C above very high voltage threshold.	
Low Line Voltage BC (Lo LineVolt BC)	Voltage between Line B and Line C below low voltage threshold.	Check why voltage is low.
Very Low Line Voltage BC (VLo LineVolt BC)	Voltage between Line B and Line C below very low voltage threshold.	
High Line Voltage CA (Hi LineVolt CA)	Voltage between Line C and Line A above high voltage threshold.	Check why voltage is high.
Very High Line Voltage CA (VHi LineVolt CA)	Voltage between Line C and Line A above very high voltage threshold.	
Low Line Voltage CA (Lo LineVolt CA)	Voltage between Line C and Line A below low voltage threshold.	Check why voltage is low.
Very Low Line Voltage CA (VLo LineVolt CA)	Voltage between Line C and Line A below very low voltage threshold.	
High Phase Voltage A (Hi PhaseVolt A)	Phase A voltage is above high voltage threshold.	Check why voltage is high.
Very High Phase Voltage A (VHi PhaseVolt A)	Phase A voltage is above very high voltage threshold.	
Low Phase Voltage A (Lo PhaseVolt A)	Phase A voltage is below low voltage threshold.	Check why voltage is low.
Very Low Phase Voltage A (VLo PhaseVolt A)	Phase A voltage is below very low voltage threshold.	
High Phase Voltage B (Hi PhaseVolt B)	Phase B voltage is above high voltage threshold.	Check why voltage is high.
Very High Phase Voltage B (VHi PhaseVolt B)	Phase B voltage is above very high voltage threshold.	
Low Phase Voltage B (Lo PhaseVolt B)	Phase B voltage is below low voltage threshold.	Check why voltage is low.
Very Low Phase Voltage B (VLo PhaseVolt B)	Phase B voltage is below very low voltage threshold.	
High Phase Voltage C (Hi PhaseVolt C)	Phase C voltage is above high voltage threshold.	Check why voltage is high.
Very High Phase Voltage C (VHi PhaseVolt C)	Phase C voltage is above very high voltage threshold.	
Low Phase Voltage C (Lo PhaseVolt C)	Phase C voltage is below low voltage threshold.	Check why voltage is low.
Very Low Phase Voltage C (VLo PhaseVolt C)	Phase C voltage is below very low voltage threshold.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Mains Failure (Mains Failure)	Commercial AC power failure.	Check why no commercial AC power.
Severe Mains Failure (SevereMainsFail)	Commercial AC power voltage is too low.	Check why voltage is low.
High Frequency (High Frequency)	Commercial AC power has high frequency.	--
Low Frequency (Low Frequency)	Commercial AC power has low frequency.	--
High Temperature (High Temp)	AC input temperature sensor sensing high temperature condition.	--
Low Temperature (Low Temperature)	AC input temperature sensor sensing low temperature condition.	--
Phase A High Current (PH-A Hi Current)	High phase A current.	--
Phase B High Current (PH-B Hi Current)	High phase B current.	--
Phase C High Current (PH-C Hi Current)	High phase C current.	--
IB (Interface Board) Alarms (IB board must be present in system) (IB)		
Communication Fail (Comm Fail)	IB board has lost communications with the controller.	Check communications cables.
Digital Input 1 Alarm (DI1 Alarm)	Digital input #1 in alarm state.	--
...	...	...
Digital Input 8 Alarm (DI8 Alarm)	Digital input #8 in alarm state.	--
Testing Relay1 (Testing Relay1)	Testing Relay 1 (on IB2 Board).	--
...	...	
Testing Relay8 (Testing Relay8)	Testing Relay 8 (on IB2 Board).	
EIB (Extended Interface Board) Alarms (EIB2 board must be present in system) (EIB)		
EIB Communication Fail (EIB Comm Fail)	EIB board has lost communications with the controller.	Check communications cables.
Bad Battery Block (Bad Batt Block)	Battery block fails.	Check batteries.
Relay 9 Test (Relay 9 Test)	Testing Relay 9 (on EIB Board).	--
...	...	
Relay 13 Test (Relay 13 Test)	Testing Relay 13 (on EIB Board).	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
SMDU Unit 1 [2, 3, 4, 5, 6, 7, 8] Alarms (SM-DU Module must be present in system) (SMDU 1 [2, 3, 4, 5, 6, 7, 8])		
Under Voltage (Under Voltage)	Distribution voltage is below under voltage threshold.	Check why system voltage is low.
Over Voltage (Over Voltage)	Distribution voltage is above over voltage threshold.	Check why system voltage is low.
Communication Fail (Comm Fail)	The SM-DU 1 has lost communications with the Controller.	Check communications cables.
Current1 High Current (Curr 1 Hi)	Current 1 has high current.	Check why current is high.
Current1 Very High Current (Curr 1 Very Hi)	Current 1 has very high current.	
...	...	
...	...	
Current5 High Current (Curr 5 Hi)	Current 5 has high current.	
Current5 Very High Current (Curr 5 Very Hi)	Current 5 has very high current.	
Shunt1 Coefficient Conflict (Shunt1 Conflict)	Shunt 1 coefficient conflicting.	Verify shunt size.
...	...	
Shunt5 Coefficient Conflict (Shunt5 Conflict)	Shunt 4 coefficient conflicting.	
Converter Group Alarms (Converter Grp)		
Multiple Converters Fail (Multi-Conv Fail)	More than one converter has failed.	Check input voltage to converters. Replace converters.
Converter Lost (Converter Lost)	A converter cannot be detected by the Controller.	Reset the Converter Lost alarm. Replace defective converter.
All Converters Comm Fail (AllConvCommFail)	No response from all converters.	Check the connectors and cables or the CAN loop. Replace the controller.
Over Current (Over Current)	Over current condition exists.	Check why.
Converter Protect (Conv Protect)	A converter is in protected mode.	Refer to Converter User Manual for troubleshooting information.
Converter Alarms (Converter)		
Communication Fail (Comm Fail)	A converter has lost communications with the controller.	Check communications cables. Reset the Communication Fail alarm. Replace the converter.
Over Temperature (Over Temp)	A converter has an over temperature condition.	Check why temperature is high.

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
HVSD Alarm (HVSD Alarm)	A converter has an overvoltage condition.	Refer to Converter User Manual for troubleshooting information.
Fan Fail (Fan Fail)	A converter's fan has failed.	Replace fan.
Power Limit (Power Limit)	A converter is in temperature power limit.	Converter overload. The load is higher than converter capacity.
Low Input Volt (Low Input Volt)	Input voltage to a converter is low.	--
Converter Fail (Converter Fail)	A converter has a fault condition.	Refer to Converter User Manual for troubleshooting information.
EEPROM Fail (EEPROM Fail)	A converter's EEPROM has failed.	
Thermal Shutdown (Thermal SD)	A converter is in thermal shutdown.	
Mod ID Overlap (Mod ID Overlap)	Converter module ID's overlap.	--
Under Voltage (Under Voltage)	A converter has an under voltage condition.	--
Over Voltage (Over Voltage)	A converter has an over voltage condition.	--
Under Voltage (24V) (24V Under Volt)	A converter has an under voltage condition.	--
Over Voltage (24V) (24V Over Volt)	A converter has an over voltage condition.	--
SMIO Generic Unit 1 Alarms (SM-IO Module must be present in system) (SMIO 1)		
SMIO Failure (SMIO Fail)	SMIO has failed.	--
SMIO Generic Unit 3 [4, 5, 6, 7, 8] Alarms (SM-IO Module must be present in system) (SMIO Unit 3 [4, 5, 6, 7, 8])		
High Analog Input 1 Alarm (Hi AI 1 Alarm)	Input #1 above high alarm threshold.	--
Low Analog Input 1 Alarm (Low AI 1 Alarm)	Input #1 below low alarm threshold.	--
...	...	--
...	...	--
High Analog Input 5 Alarm (Hi AI 5 Alarm)	Input #5 above high alarm threshold.	--
Low Analog Input 5 Alarm (Low AI 5 Alarm)	Input #5 below low alarm threshold.	--
High Frequency Input Alarm (Hi Freq In Alm)	Input frequency above high frequency alarm threshold.	--

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Low Frequency Input Alarm (Low Freq In Alm)	Input frequency below low frequency alarm threshold.	--
SMIO Failure (SMIO Fail)	SM-IO board failure.	Replace the board.
Testing Relay 1 (Testing Relay 1)	Testing Relay 1.	--
Testing Relay 2 (Testing Relay 2)	Testing Relay 2.	
Testing Relay 3 (Testing Relay 3)	Testing Relay 3.	
Large DU AC Distribution Group Alarms (Large Distribution Unit must be present in system) (LargeDUACDist)		
Mains Failure (Mains Failure)	Commercial AC power failure.	--
Large DU AC Distribution Unit Alarms (Large Distribution Unit must be present in system) (AC Distributi)		
Mains 1 Failure (Mains 1 Fail)	AC input 1 power failure.	--
Mains 2 Failure (Mains 2 Fail)	AC input 2 power failure.	--
Mains 3 Failure (Mains 3 Fail)	AC input 3 power failure.	--
Mains 1 Uab/Ua Failure (M1 Uab/Ua Fail)	No AC input voltage between Line A and Line B of input 1.	--
Mains 1 Ubc/Ub Failure (M1 Ubc/Ub Fail)	No AC input voltage between Line B and Line C of input 1.	--
Mains 1 Uca/Uc Failure (M1 Uca/Uc Fail)	No AC input voltage between Line C and Line A of input 1.	--
Mains 2 Uab/Ua Failure (M2 Uab/Ua Fail)	No AC input voltage between Line A and Line B of input 2.	--
Mains 2 Ubc/Ub Failure (M2 Ubc/Ub Fail)	No AC input voltage between Line B and Line C of input 2.	--
Mains 2 Uca/Uc Failure (M2 Uca/Uc Fail)	No AC input voltage between Line C and Line A of input 2.	--
Mains 3 Uab/Ua Failure (M3 Uab/Ua Fail)	No AC input voltage between Line A and Line B of input 3.	--
Mains 3 Ubc/Ub Failure (M3 Ubc/Ub Fail)	No AC input voltage between Line B and Line C of input 3.	--
Mains 3 Uca/Uc Failure (M3 Uca/Uc Fail)	No AC input voltage between Line C and Line A of input 3.	--
Over Frequency (Over Frequency)	Input frequency above over frequency alarm threshold.	--
Under Frequency (Under Frequency)	Input frequency below under frequency alarm threshold.	--

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Mains 1 Uab/Ua Over Voltage (M1 Uab/Ua OverV)	AC input 1 voltage between Line A and Line B above over voltage threshold.	--
Mains 1 Ubc/Ub Over Voltage (M1 Ubc/Ub OverV)	AC input 1 voltage between Line B and Line C above over voltage threshold.	--
Mains 1 Uca/Uc Over Voltage (M1 Uca/Uc OverV)	AC input 1 voltage between Line C and Line A above over voltage threshold.	--
Mains 2 Uab/Ua Over Voltage (M2 Uab/Ua OverV)	AC input 2 voltage between Line A and Line B above over voltage threshold.	--
Mains 2 Ubc/Ub Over Voltage (M2 Ubc/Ub OverV)	AC input 2 voltage between Line B and Line C above over voltage threshold.	--
Mains 2 Uca/Uc Over Voltage (M2 Uca/Uc OverV)	AC input 2 voltage between Line C and Line A above over voltage threshold.	--
Mains 3 Uab/Ua Over Voltage (M3 Uab/Ua OverV)	AC input 3 voltage between Line A and Line B above over voltage threshold.	--
Mains 3 Ubc/Ub Over Voltage (M3 Ubc/Ub OverV)	AC input 3 voltage between Line B and Line C above over voltage threshold.	--
Mains 3 Uca/Uc Over Voltage (M3 Uca/Uc OverV)	AC input 3 voltage between Line C and Line A above over voltage threshold.	--
Mains 1Uab/Ua Under Voltage (M1Uab/Ua UnderV)	AC input 1 voltage between Line A and Line B below under voltage threshold.	--
Mains 1Ubc/Ub Under Voltage (M1Ubc/Ub UnderV)	AC input 1 voltage between Line B and Line C below under voltage threshold.	--
Mains 1Uca/Uc Under Voltage (M1Uca/Uc UnderV)	AC input 1 voltage between Line C and Line A below under voltage threshold.	--
Mains 2Uab/Ua Under Voltage (M2Uab/Ua UnderV)	AC input 2 voltage between Line A and Line B below under voltage threshold.	--
Mains 2Ubc/Ub Under Voltage (M2Ubc/Ub UnderV)	AC input 2 voltage between Line B and Line C below under voltage threshold.	--
Mains 2Uca/Uc Under Voltage (M2Uca/Uc UnderV)	AC input 2 voltage between Line C and Line A below under voltage threshold.	--
Mains 3Uab/Ua Under Voltage (M3Uab/Ua UnderV)	AC input 3 voltage between Line A and Line B below under voltage threshold.	--
Mains 3Ubc/Ub Under Voltage (M3Ubc/Ub UnderV)	AC input 3 voltage between Line B and Line C below under voltage threshold.	--
Mains 3Uca/Uc Under Voltage (M3Uca/Uc UnderV)	AC input 3 voltage between Line C and Line A below under voltage threshold.	--
AC Input MCCB Trip (Input MCCB Trip)	Main input circuit breaker open.	--
AC Output MCCB Trip (OutputMCCB Trip)	Main output circuit breaker open.	--
SPD Trip (SPD Trip)	Surge protection device tripped.	--
No Response (Comm Fail)	AC distribution monitoring device has lost communications with the controller.	Check communications cables.

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Large DU DC Distribution Unit Alarms (Large Distribution Unit must be present in system) (DC Distributi)		
DC Overvoltage (DC Overvolt)	DC output voltage above overvoltage threshold.	--
DC Undervoltage (DC Undervolt)	DC output voltage below undervoltage threshold.	--
DC Output 1 Disconnected (Output1 Discon)	Output #1 distribution device open.	--
...	...	--
DC Output 64 Disconnected (Output64 Discon)	Output #64 distribution device open.	--
Not Responding (Comm Fail)	DC distribution monitoring device has lost communications with the controller.	Check communications cables.
High Temperature 1 (T1 High Temp)	Temperature sensor #1 sensing temperature higher than high temperature threshold.	--
High Temperature 2 (T2 High Temp)	Temperature sensor #2 sensing temperature higher than high temperature threshold.	--
High Temperature 3 (T3 High Temp)	Temperature sensor #3 sensing temperature higher than high temperature threshold.	--
Low Temperature 1 (T1 Low Temp)	Temperature sensor #1 sensing temperature lower than low temperature threshold.	--
Low Temperature 2 (T2 Low Temp)	Temperature sensor #2 sensing temperature lower than low temperature threshold.	--
Low Temperature 3 (T3 Low Temp)	Temperature sensor #3 sensing temperature lower than low temperature threshold.	--
Temperature 1 Sensor Fault (T1 Sensor Fail)	Temperature sensor #1 failure.	--
Temperature 2 Sensor Fault (T2 Sensor Fail)	Temperature sensor #2 failure.	--
Temperature 3 Sensor Fault (T3 Sensor Fail)	Temperature sensor #3 failure.	--
Diesel Generator Group Alarms (Dsl Gen Group)		
Diesel Test in Progress (Test Running)	Diesel test in progress.	--
Diesel Generator Test Failure (Test Failure)	Diesel test failed.	--
Diesel Generator Alarms (Dsl Generator)		
Low DC Voltage (Low DC Voltage)	Generator has low DC voltage.	--
Diesel Generator Supervision Fai (SupervisionFail)	Generator monitoring device has failed.	--

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Diesel Generator Failure (Diesel Fail)	Generator has failed.	--
Diesel Generator Connected (Diesel Connect)	Generator is connected to the system.	--
Low Fuel Level (Low Fuel Level)	Generator has low fuel level.	--
High Water Temperature (High Water Temp)	Generator has high water temperature.	--
Low Oil Pressure (Low Oil Press)	Generator has low oil pressure.	--
Periodical Maintenance Required (Maint Required)	Periodical maintenance is required to be performed.	--
Rectifier Group 2 [3, 4] Alarms (Rect Group 2 [3, 4])		
All Rectifiers Comm Fail (AllRectCommFail)	No response from all rectifiers.	Check the connectors and cables or the CAN loop. Replace the controller.
Rectifier Lost (Rectifier Lost)	A rectifier cannot be detected by the controller.	Reset the Rectifier Lost alarm. Replace defective rectifier.
Communication Failure (Comm Failure)	A rectifier has lost communications with the controller.	Reset the Comm Fail alarm. Replace defective rectifier.
Mains Failure (Mains Failure)	Rectifier commercial AC input power failure.	--
Multiple Rectifiers Fail (Multi-Rect Fail)	More than one rectifier has failed.	Check input voltage to rectifiers. Replace rectifiers.
Group I [II, III] Rectifier Alarms (Group I [II, III] Rect)		
AC Input Failure (AC Failure)	No AC input power to a rectifier.	Check why no AC input power available.
Rectifier HighTemperature (Rect Temp High)	A rectifier has a high temperature condition.	Check why temperature is high.
Rectifier Fault (Rect Fault)	A rectifier has a fault condition.	Refer to Rectifier User Manual for troubleshooting information.
Overvoltage (Overvoltage)	A rectifier has an over voltage condition.	
Rectifier Protected (Rect Protected)	A rectifier is in protected mode.	
Fan Failure (Fan Failure)	A rectifier's fan has failed.	Replace fan.

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Current Limit (Current Limit)	A rectifier is in current limit.	Rectifier overload. The load is higher than rectifier capacity. If the batteries are being recharged, the alarm will cease by itself when the battery voltage has increased to the charging level. If the system load is higher than the rectifier capacity, the batteries will discharge. If this is the reason, install additional rectifiers. If one or more of the rectifiers are defective, replace the faulty rectifiers.
Rectifier Communication Fail (Rect Comm Fail)	A rectifier has lost communications with the controller.	Check communications cables. Reset the Communication Fail alarm. Replace the rectifier.
Derated (Derated)	A rectifier is in output power derating mode.	Refer to Rectifier User Manual for troubleshooting information.
Current Sharing Alarm (CurrShare Alarm)	A rectifier has a current sharing alarm.	
AC Undervoltage Protection (AC UnderV Protect)	A rectifier is in under voltage protection mode.	
SMDUP 1 [2, 3, 4, 5, 6, 7, 8] Unit Alarms (SM-DU+ Module must be present in system) (SMDUP 1 [2, 3, 4, 5, 6, 7, 8])		
Communication Fail (Comm Fail)	Communications failure.	Check communications cables.
Current1 High Current (Curr 1 Hi)	Current 1 high.	--
Current1 Very High Current (Curr 1 Very Hi)	Current 1 very high.	--
...	...	--
...	...	--
Current25 High Current (Curr 25 Hi)	Current 25 high.	--
Current25 Very High Current (Curr 25 Very Hi)	Current 25 very high.	--
Shunt Coefficient Conflict (Shunt Conflict)	Shunt coefficient conflicting.	Verify shunt size.
SMDUH Unit 1 [2, 3, 4, 5, 6, 7, 8] Alarms (SM-DUH Module must be present in system) (SMDUH 1 [2, 3, 4, 5, 6, 7, 8])		
Under Voltage (Under Voltage)	Distribution voltage is below low voltage threshold.	Check why system voltage is low.
Over Voltage (Over Voltage)	Distribution voltage is above high voltage threshold.	Check why system voltage is low.
Communication Fail (Comm Fail)	The SM-DU 1 has lost communications with the controller.	Check communications cables.

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
SM-BRC Unit Alarms (SM-BRC Module must be present in system) (SMBRC Unit)		
Communication Failure (Comm Fail)	Communications failure.	Check communications cables.
High Ambient Temperature (High Amb Temp)	Ambient high temperature alarm.	--
Low Ambient Temperature (Low Amb Temp)	Ambient low temperature alarm.	--
Ambient Temperature Probe Failure (AmbSensor Fault)	Ambient temperature sensor failure.	Replace temperature sensor.
Fuel Tank Group Alarms (Fuel Tank Grp)		
Fuel Group Communication Failure (Fuel Comm Fail)	Fuel tank group communication failure.	Check communications cables.
OBFuel Tank Alarms (OBFuel Tank)		
High Fuel Level Alarm (Hi Level Alarm)	Fuel tank high level alarm.	--
Low Fuel Level Alarm (Low Level Alarm)	Fuel tank low level alarm.	--
Fuel Theft Alarm (Fuel Theft Alm)	Fuel tank theft alarm.	--
Tank Height Error (Tank Height Err)	Fuel tank height error.	--
Fuel Tank Config Error (Fuel Config Err)	Fuel tank configuration error.	--
SM Temp Group Alarms (SM-Temp Module must be present in system) (SM Temp Group)		
SM Temp Lost (SMTemp Lost)	SM-Temp cannot be detected by the controller.	Reset the SMTemp Lost alarm. Replace defective SM-Temp.
SM Temp 1-8 Alarms (SM-Temp Module must be present in system) (SMTemp 1-8)		
Communication Fail (Comm Fail)	SM-Temp has lost communications with the controller.	Check communications cables.
Temperature Probe 1 Shorted (Probe1 Short)	Probe shorted.	Replace temperature probe.
...	...	
Temperature Probe 8 Shorted (Probe8 Short)	Probe shorted.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Temperature Probe 1 Open (Probe1 Open)	Probe open.	Replace temperature probe.
...	...	
Temperature Probe 8 Open (Probe8 Open)	Probe open.	
DC Meter Group Alarms (DC Meter must be present in system) (DC Meter Group)		
DC Meter Lost (DC Meter Lost)	DC meter cannot be detected by the controller.	Reset the DC Meter Lost alarm. Replace defective DC Meter.
DC Meter Alarms (DC Meter must be present in system) (DC Meter)		
Communication Fail (Comm Fail)	DC meter has lost communications with the controller.	Check communications cables.
Solar Converter Group Alarms (Solar Conv Grp)		
Multiple Solar Converter Failure (Multi-Conv Fail)	More than one solar converter has failed.	Check input voltage to solar converters. Replace solar converters.
Solar Converter Lost (Solar Converter Lost)	A solar converter cannot be detected by the controller.	Reset the Solar Converter Lost alarm. Replace defective solar converter.
All Solar Converters Comm Fail (AllConvCommFail)	No response from all solar converters.	Check the connectors and cables or the CAN loop. Replace the controller.
Solar Converter Alarms (Solar Converter)		
Input Failure (Input Failure)	No input power to a solar converter.	Check why no input power available.
Solar Converter Temperature High (Conv Temp High)	A solar converter has a high temperature condition.	Check why temperature is high.
Solar Converter Fail (Conv Fail)	A solar converter has a fault condition.	Refer to Solar Converter User Manual for troubleshooting information.
Over Voltage (HVSD)	A solar converter has an overvoltage condition.	
Solar Converter Protected (Conv Protected)	A solar converter is in protected mode.	
Fan Fail (Fan Fail)	A solar converter's fan has failed.	Replace fan.
Current Limit (Current Limit)	A solar converter is in current limit.	Solar converter overload. The load is higher than solar converter capacity. If one or more of the solar converters are defective, replace the faulty solar converters.
Solar Converter Comm Fail (Conv Comm Fail)	A solar converter has lost communications with the controller.	Check communications cables. Reset the Solar Converter Communication Fail alarm. Replace the solar converter.

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Derated (Derated)	A solar converter is in output power derating mode.	Refer to Solar Converter User Manual for troubleshooting information.
Current Share Alarm (Curr Share Alm)	A solar converter has a current sharing alarm.	
Input Under Voltage Protection (Low Input Protect)	A solar converter is in under voltage protection mode.	
Input Not DC	Input to solar converter mounting position is not DC.	--
AC Meter (AC Meter must be present in system) (AC Meter)		
Communication Fail (Comm Fail)	AC meter has lost communications with the controller.	Check communications cables.
Line AB Over Voltage 1 (L-AB Over Volt1)	Voltage between Line A and Line B is higher than the Line AB Over Voltage 1 Alarm threshold.	Check why voltage is high.
Line AB Over Voltage 2 (L-AB Over Volt2)	Voltage between Line A and Line B is higher than the Line AB Over Voltage 2 Alarm threshold.	
Line AB Under Voltage 1 (L-AB UnderVolt1)	Voltage between Line A and Line B is lower than the Line AB Under Voltage 1 Alarm threshold.	Check why voltage is low.
Line AB Under Voltage 2 (L-AB UnderVolt2)	Voltage between Line A and Line B is lower than the Line AB Under Voltage 2 Alarm threshold.	
Line BC Over Voltage 1 (L-BC Over Volt1)	Voltage between Line B and Line C is higher than the Line BC Over Voltage 1 Alarm threshold.	Check why voltage is high.
Line BC Over Voltage 2 (L-BC Over Volt2)	Voltage between Line B and Line C is higher than the Line BC Over Voltage 2 Alarm threshold.	
Line BC Under Voltage 1 (L-BC UnderVolt1)	Voltage between Line B and Line C is lower than the Line BC Under Voltage 1 Alarm threshold.	Check why voltage is low.
Line BC Under Voltage 2 (L-BC UnderVolt2)	Voltage between Line B and Line C is lower than the Line BC Under Voltage 2 Alarm threshold.	
Line CA Over Voltage 1 (L-CA Over Volt1)	Voltage between Line C and Line A is higher than the Line CA Over Voltage 1 Alarm threshold.	Check why voltage is high.
Line CA Over Voltage 2 (L-CA Over Volt2)	Voltage between Line C and Line A is higher than the Line CA Over Voltage 2 Alarm threshold.	

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Line CA Under Voltage 1 (L-CA UnderVolt1)	Voltage between Line C and Line A is lower than the Line CA Under Voltage 1 Alarm threshold.	Check why voltage is low.
Line CA Under Voltage 2 (L-CA UnderVolt2)	Voltage between Line C and Line A is lower than the Line CA Under Voltage 2 Alarm threshold.	
Phase A Over Voltage 1 (PH-A Over Volt1)	Phase A voltage is above over voltage 1 threshold.	Check why voltage is high.
Phase A Over Voltage 2 (PH-A Over Volt2)	Phase A voltage is above over voltage 2 threshold.	
Phase A Under Voltage 1 (PH-A UnderVolt1)	Phase A voltage is below under voltage 1 threshold.	Check why voltage is low.
Phase A Under Voltage 2 (PH-A UnderVolt2)	Phase A voltage is below under voltage 2 threshold.	
Phase B Over Voltage 1 (PH-B Over Volt1)	Phase B voltage is above over voltage 1 threshold.	Check why voltage is high.
Phase B Over Voltage 2 (PH-B Over Volt2)	Phase B voltage is above over voltage 2 threshold.	
Phase B Under Voltage 1 (PH-B UnderVolt1)	Phase B voltage is below under voltage 1 threshold.	Check why voltage is low.
Phase B Under Voltage 2 (PH-B UnderVolt2)	Phase B voltage is below under voltage 2 threshold.	
Phase C Over Voltage 1 (PH-C Over Volt1)	Phase C voltage is above over voltage 1 threshold.	Check why voltage is high.
Phase C Over Voltage 2 (PH-C Over Volt2)	Phase C voltage is above over voltage 2 threshold.	
Phase C Under Voltage 1 (PH-C UnderVolt1)	Phase C voltage is below under voltage 1 threshold.	Check why voltage is low.
Phase C Under Voltage 2 (PH-C UnderVolt2)	Phase C voltage is below under voltage 2 threshold.	
Mains Failure (Mains Failure)	Commercial AC power failure.	Check why no commercial AC power.
Severe Mains Failure (SevereMainsFail)	Commercial AC power voltage is too low.	Check why voltage is low.
High Frequency (High Frequency)	Commercial AC power has high frequency.	--
Low Frequency (Low Frequency)	Commercial AC power has low frequency.	--
High Temperature (High Temp)	AC input temperature sensor sensing high temperature condition.	--
Low Temperature (Low Temperature)	AC input temperature sensor sensing low temperature condition.	--
Phase A High Current (PH-A Hi Current)	High phase A current.	--

Table 5

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Phase B High Current (PH-B Hi Current)	High phase B current.	--
Phase C High Current (PH-C Hi Current)	High phase C current.	

Local Display Menus

Overview

This section provides descriptions of the Local Display Menus. Refer also to “Passwords and Privilege Levels” on page 13 and “Description of Local Display Menus Programmable Parameters” on page 82. For Web Interface, refer to “Web Interface Screens” on page 88.

Menus

Figure 10 to Figure 18 provide flow diagrams of the menus accessed via the NCU Controller local display and keypad.

Note: *These instructions describe the complete functionality of the NCU Controller. Some functionality is dependent on hardware connected to the NCU Controller. Some menu items shown may not be present in the NCU Controller used in your system.*

FACTORY DEFAULT SETPOINTS

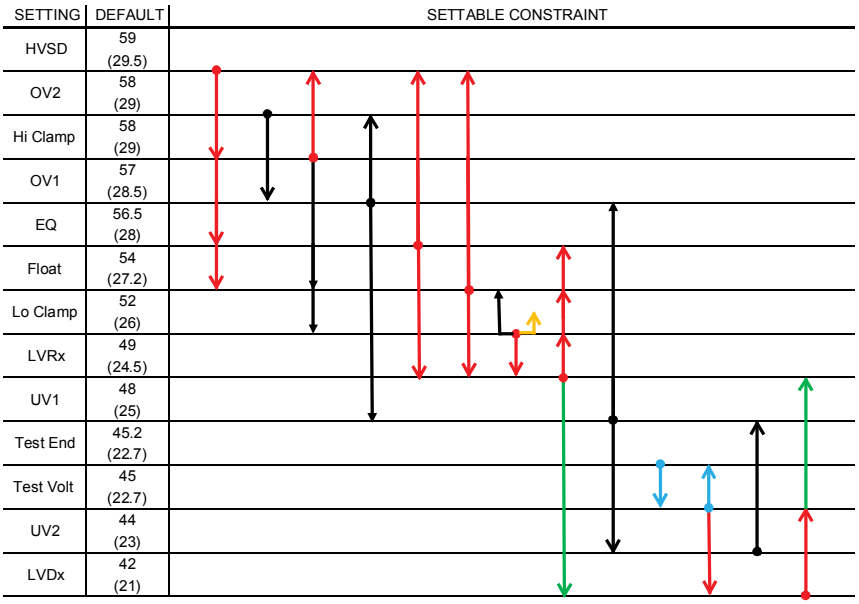
Refer to the Configuration Drawing (C-drawing) furnished with your system for a list of factory default values.

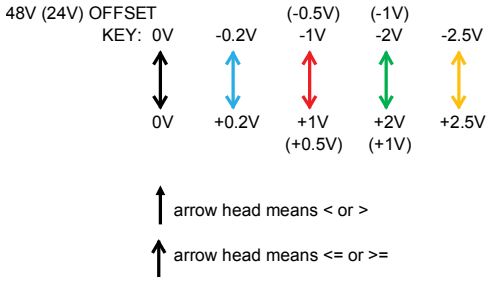
ADJUSTMENT RANGE RESTRICTIONS

See Figure 9.

Figure 9. Adjustment Range Restrictions

NCU Setting Restriction





Setting Float:
Float >= LVRx +1 for 48V, +0.5 for 24V
Float <= HVSD -1 for 48V, -0.5 for 24V

Setting EQ:
EQ >= LVRx +1 for 48V, +0.5 for 24V
EQ <= HVSD -1 for 48V, -0.5 for 24V

Setting HVSD:
HVSD >= DCV Control +1 for 48V, +0.5 for 24V
HVSD >= Float +1 for 48V, +0.5 for 24V
HVSD >= EQ +1 for 48V, +0.5 for 24V
HVSD >= Hi Clamp +1 for 48V, +0.5 for 24V

Setting OV1:
OV1 <= OV2
OV1 > UV1

Setting OV2:
OV2 >= OV1

Setting UV1:
UV1 >= UV2
UV1 < OV1

Setting UV2:
UV2 <= UV1

Setting LVDx:
LVDx <= LVRx -2 for 48V, -1 for 24V
LVDx <= Test Volt -1 for 48V, -0.5 for 24V

Setting LVRx:
LVRx <= Float -1 for 48V, -0.5 for 24V
LVRx <= EQ -1 for 48V, -0.5 for 24V
LVRx <= Lo Clamp -1 for 48V, -0.5 for 24V
LVRx >= LVDx +2 for 48V, +1 for 24V

Setting Hi Clamp:
Hi Clamp > Float
Hi Clamp > Lo Clamp
Hi Clamp <= HVSD -1 for 48V, -0.5 for 24V

Setting Lo Clamp:
Lo Clamp < Float
Lo Clamp >= Float - 2.5
Lo Clamp >= LVRx +1 for 48V, +0.5 for 24V

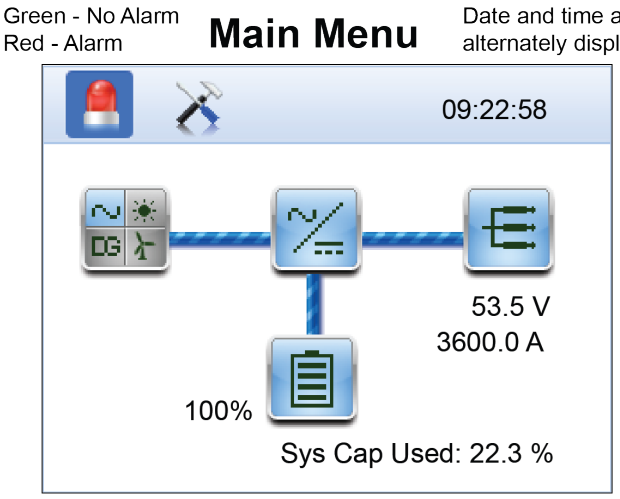
Setting Test Volt:
Test Volt <= Test End -0.2
Test Volt >= LVDx +1 for 48V, +0.5 for 24V

Setting Test End:
Test End >= Test Volt +0.2

Main Menu

The Main Menu is shown in Figure 10. This is the first screen displayed when the local display is activated by pressing any key on the NCU's front panel.

Figure 10. Main Menu



Graphics	Menu Name	Description
	Alarm (Green - No Alarm) (Red - Alarm)	View active alarms and alarm history.
	Settings	Gain access to the NCU Controller's settings menus.
	Input Power	View AC, Solar, DG, and Wind related information.
	Module	View rectifier /converter related information.
	DC	View DC equipments related information.
	Battery	View battery related information.

Press the UP and DOWN keys to highlight the desired Menu graphic in the Main Menu.

Press the ENT key to enter the selected menu.

To log out, from the Main Menu, press the **Up Arrow**, **Down Arrow**, and **ESC** at the same time. Release all keys.

To reboot the Controller, from the Main Menu, press **ENT** and **ESC** at the same time. Release both keys. Press ENT to confirm.

Privilege Level	Default User Name and Password	Authority
Level A (Browser)	none set	The User can only read (browse) information in the menus.
Level B (Operator)	none set	The User has access to the system "Control" menus.
Level C (Engineer)	none set	The User has access to the system "Settings" menus and can download the configuration package. The User does not have access to update the OS application and modify, add, or delete Users.
Level D (Administrator)	admin, 640275	The User has full access to all menus; including update the OS application and modifying, adding, and deleting Users.

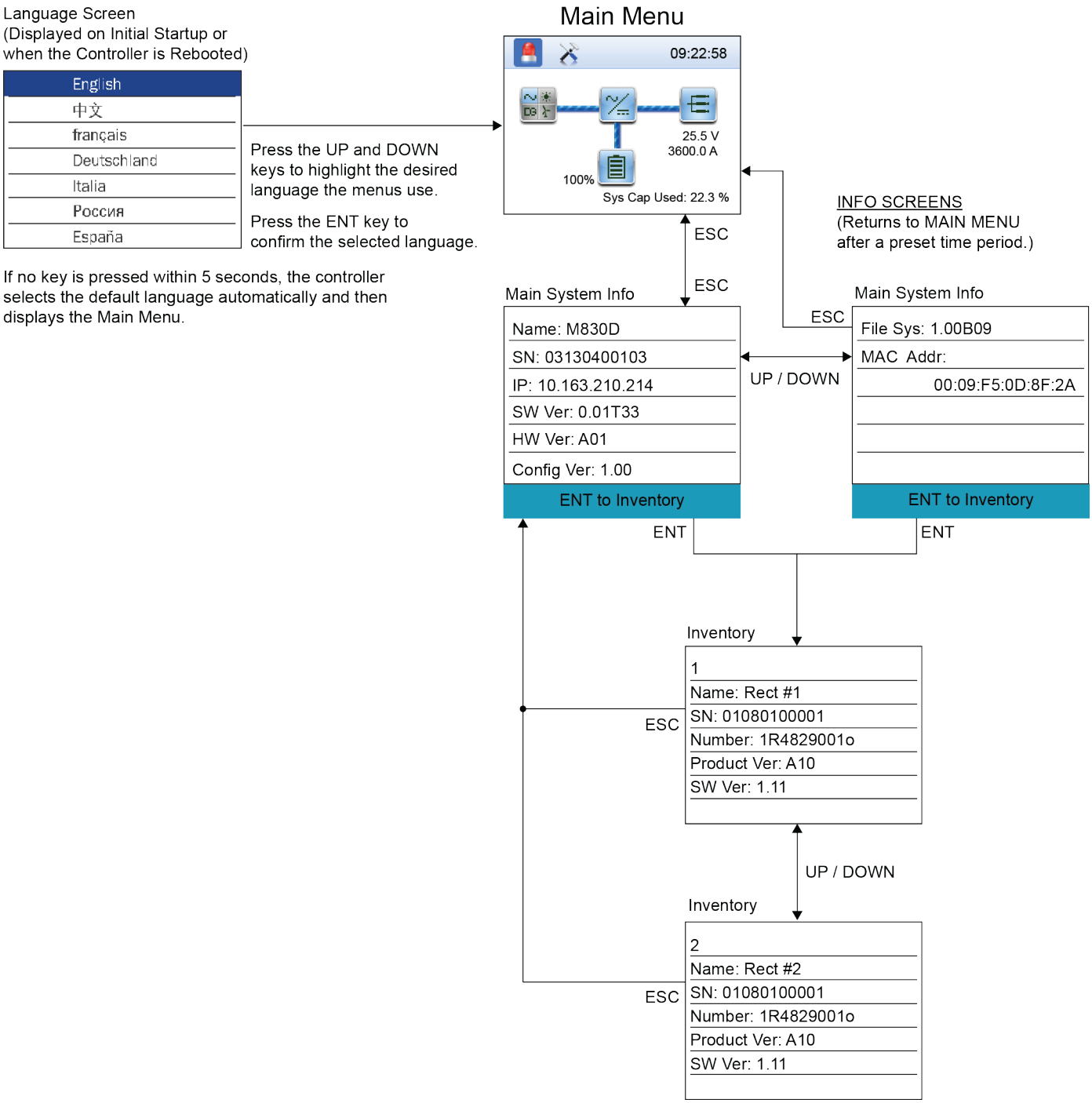
Once a password is entered, it remains in effect for a preset time period to allow navigating between menus without re-entering the password.

A User has access to his/her level menus, plus all menus of the lesser access levels.

Controller Information Menu (accessed from the Main Menu)

Controller information screens can be accessed from the Main Menu as shown in Figure 11.

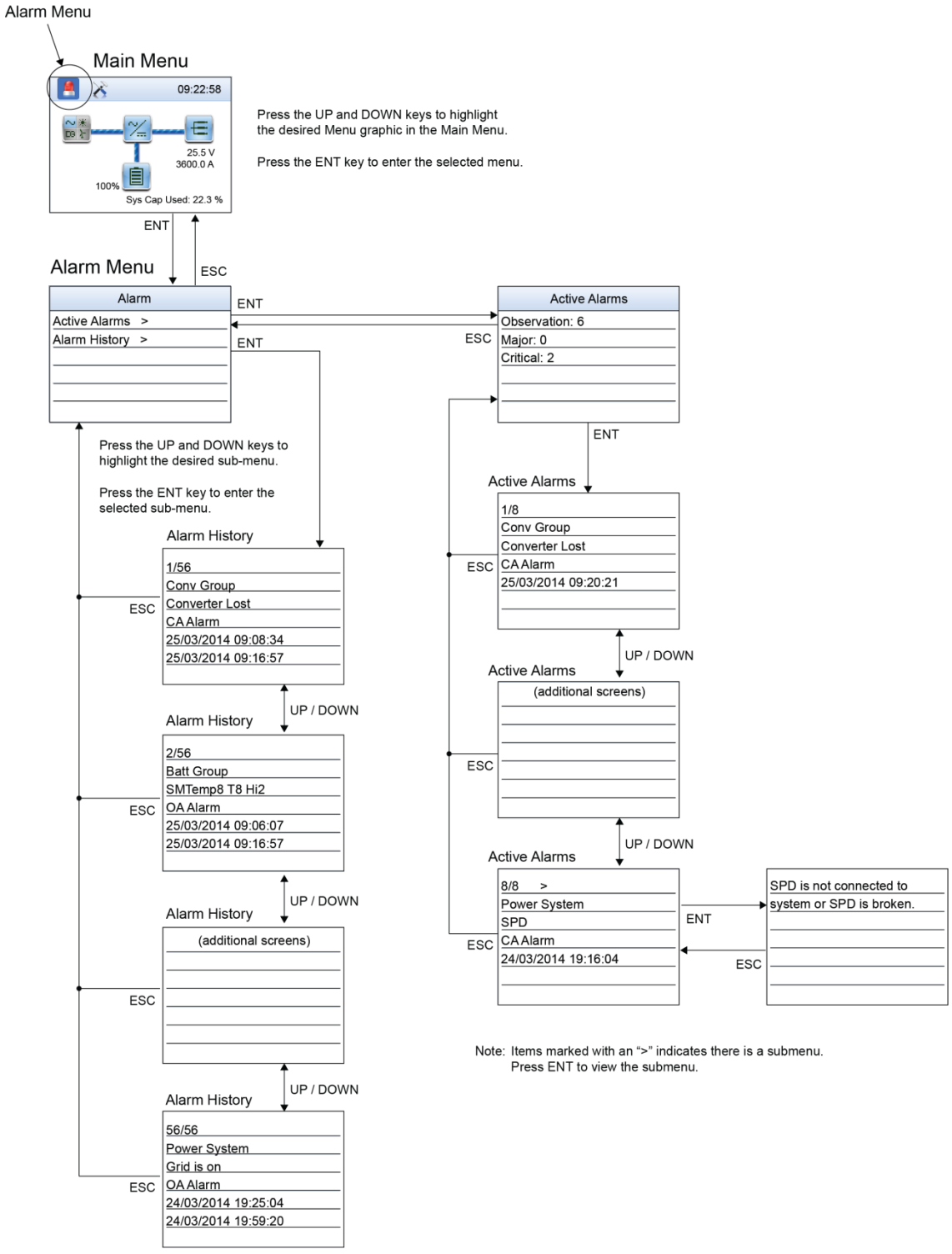
Figure 11. Controller Information Menu



Alarm Menu

The Alarm Menu can be accessed from the Main Menu as shown in Figure 12.

Figure 12. Alarm Menu



Settings Menu

The Settings Menu can be accessed from the Main Menu as shown in Figure 13.

Figure 13. Settings Menu

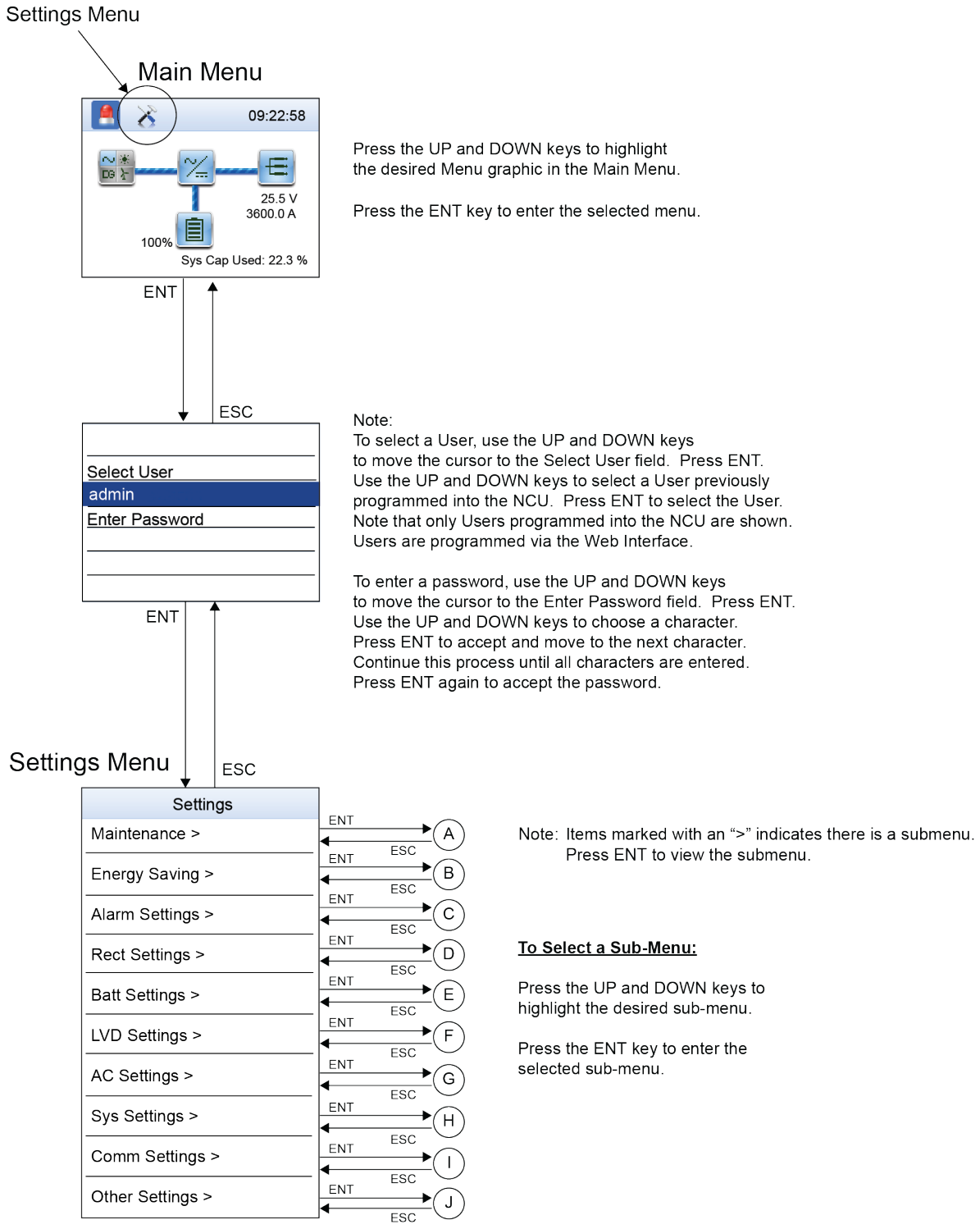
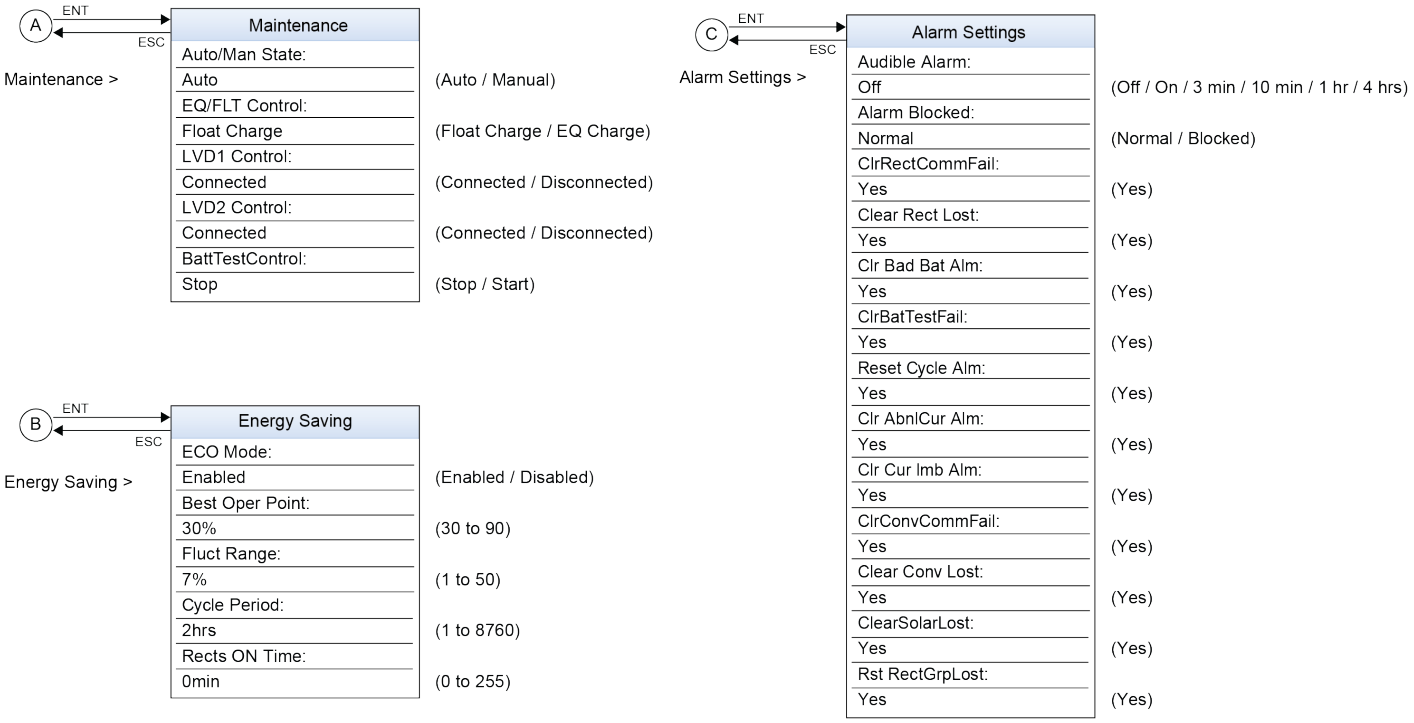

Settings Menu
Main Menu
09:22:58
25.5 V
3600.0 A
100%
Sys Cap Used: 22.3 %
ENT
ESC
Press the UP and DOWN keys to highlight the desired Menu graphic in the Main Menu.
Press the ENT key to enter the selected menu.
Select User
admin
Enter Password
ENT
ESC
Note:
To select a User, use the UP and DOWN keys to move the cursor to the Select User field. Press ENT.
Use the UP and DOWN keys to select a User previously programmed into the NCU. Press ENT to select the User.
Note that only Users programmed into the NCU are shown.
Users are programmed via the Web Interface.
To enter a password, use the UP and DOWN keys to move the cursor to the Enter Password field. Press ENT.
Use the UP and DOWN keys to choose a character.
Press ENT to accept and move to the next character.
Continue this process until all characters are entered.
Press ENT again to accept the password.
Settings Menu
ESC
Settings
Maintenance >
Energy Saving >
Alarm Settings >
Rect Settings >
Batt Settings >
LVD Settings >
AC Settings >
Sys Settings >
Comm Settings >
Other Settings >
ENT
ESC
A
B
C
D
E
F
G
H
I
J
Note: Items marked with an ">" indicates there is a submenu.
Press ENT to view the submenu.
To Select a Sub-Menu:
Press the UP and DOWN keys to highlight the desired sub-menu.
Press the ENT key to enter the selected sub-menu.

Figure 13. Settings Menu



To Change a Parameter:

Press the UP and DOWN keys to move up and down list of parameters.

Press ENT to select the parameter.

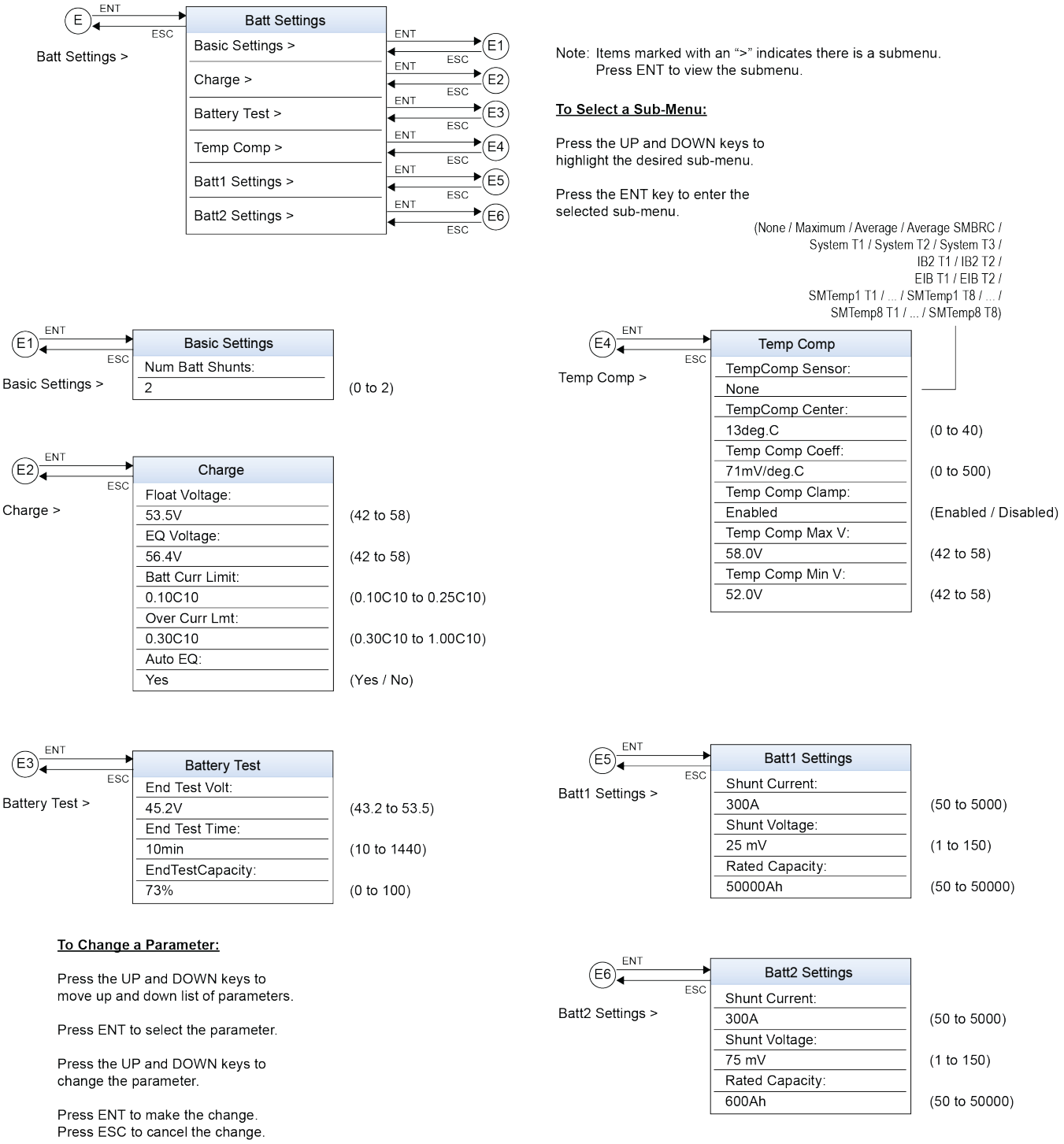
Press the UP and DOWN keys to change the parameter.

Press ENT to make the change.
Press ESC to cancel the change.

Note: Certain line items in menu or menus themselves appear if system is equipped with function or function is enabled.

The parameter values shown in ( ) are the adjustment range or acceptable values. Factory default settings are listed in the NCU Configuration Drawing (C-dwg) furnished with your system.

Figure 13. Settings Menu



Note: Items marked with an ">" indicates there is a submenu. Press ENT to view the submenu.

To Select a Sub-Menu:

Press the UP and DOWN keys to highlight the desired sub-menu.

Press the ENT key to enter the selected sub-menu.

To Change a Parameter:

Press the UP and DOWN keys to move up and down list of parameters.

Press ENT to select the parameter.

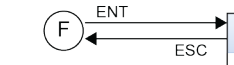
Press the UP and DOWN keys to change the parameter.

Press ENT to make the change.
Press ESC to cancel the change.

The parameter values shown in ( ) are the adjustment range or acceptable values. Factory default settings are listed in the NCU Configuration Drawing (C-dwg) furnished with your system.

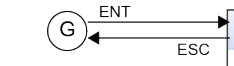
Note: Certain line items in menu or menus themselves appear if system is equipped with function or function is enabled.

Figure 13. Settings Menu



LVD Settings >

LVD Settings	
HTD Point:	
40deg.C	(20 to 80)
HTD Recon Point:	
35deg.C	(20 to 80)
LVD 1:	
Enabled	(Disabled / Enabled)
LVD 1 Mode:	
Voltage	(Voltage / Time)
LVD 1 Disc Volt:	
43.9V	(36 to 60)
LVD1 Recon Volt:	
52.4V	(40 to 60)
LVD 1 Time:	
299min	(30 to 1000)
LVD 1 HTD:	
Enabled	(Disabled / Enabled)
LVD 2:	
Enabled	(Disabled / Enabled)
LVD 2 Mode:	
Voltage	(Voltage / Time)
LVD 2 Disc Volt:	
43.1V	(36 to 60)
LVD2 Recon Volt:	
52.4V	(40 to 60)
LVD 2 Time:	
599min	(30 to 1000)
LVD 2 HTD:	
Disabled	(Disabled / Enabled)



AC Settings >

AC Settings	
Nominal AC Volt:	
230V	(50 to 450)
Mains Fail Alm1:	
4%	(0 to 100)
Mains Fail Alm2:	
4%	(0 to 100)

Note: Certain line items in menu or menus themselves appear if system is equipped with function or function is enabled.

To Change a Parameter:

Press the UP and DOWN keys to move up and down list of parameters.

Press ENT to select the parameter.

Press the UP and DOWN keys to change the parameter.

Press ENT to make the change.
Press ESC to cancel the change.

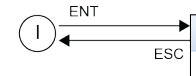
The parameter values shown in ( ) are the adjustment range or acceptable values. Factory default settings are listed in the NCU Configuration Drawing (C-dwg) furnished with your system.

Figure 13. Settings Menu

Sys Settings	
LCD Language:	
English	(English / Chinese)
Keypad Voice:	
On	(On / Off)
Date:	ENT to move cursor to first field. UP and DOWN to change value in field. Repeat for all fields. ENT to save the change. ESC to cancel.
2014-03-25	
Time:	
09:41:22	
LCD Rotation:	
Big Screen	(Big Screen)
Restore Default:	
No	(No / Yes)
Update App:	
No	(No / Yes)

Change the language option here that the LCD menus will use.

The local language selected in the Web Interface Language Tab found in the Advance Settings Menu is displayed here along side the English language option. Note that the English language option is always displayed.



Comm Settings	
Protocol:	
EEM	(EEM / YDN23 / Modbus)
DHCP:	
Disabled	(Disabled / Enabled)
IP Address:	ENT to move cursor to first field. UP and DOWN to change value in field. Repeat for all fields. ENT to save the change. ESC to cancel.
10.163.210.214	
Mask:	
255.255.255.0	
Gateway:	
10.163.210.1	

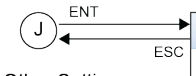
<u>To Change a Parameter:</u>

Press the UP and DOWN keys to move up and down list of parameters.

Press ENT to select the parameter.

Press the UP and DOWN keys to change the parameter.

Press ENT to make the change.
Press ESC to cancel the change.



Other Settings	
Rect Expansion:	
Inactive	(Primary / Secondary / Inactive)
Auto Config:	
Yes	(Yes, No)
LCD Display Wizard:	
Yes	(Yes, No)
Start Wizard Now:	
Yes	(Yes, No) See (J1)
Over Voltage 1:	
56.0V	(40 to 60)
Over Voltage 2:	
58.0V	(40 to 60)
Under Voltage 1:	
48.0V	(40 to 60)
Under Voltage 2:	
44.0V	(40 to 60)
Conv Volt Set:	
27.0V	(24 to 28)

If “Secondary” selected above, then the following menu item appears after automatic reboot.

Address (201 / 202 / 203)

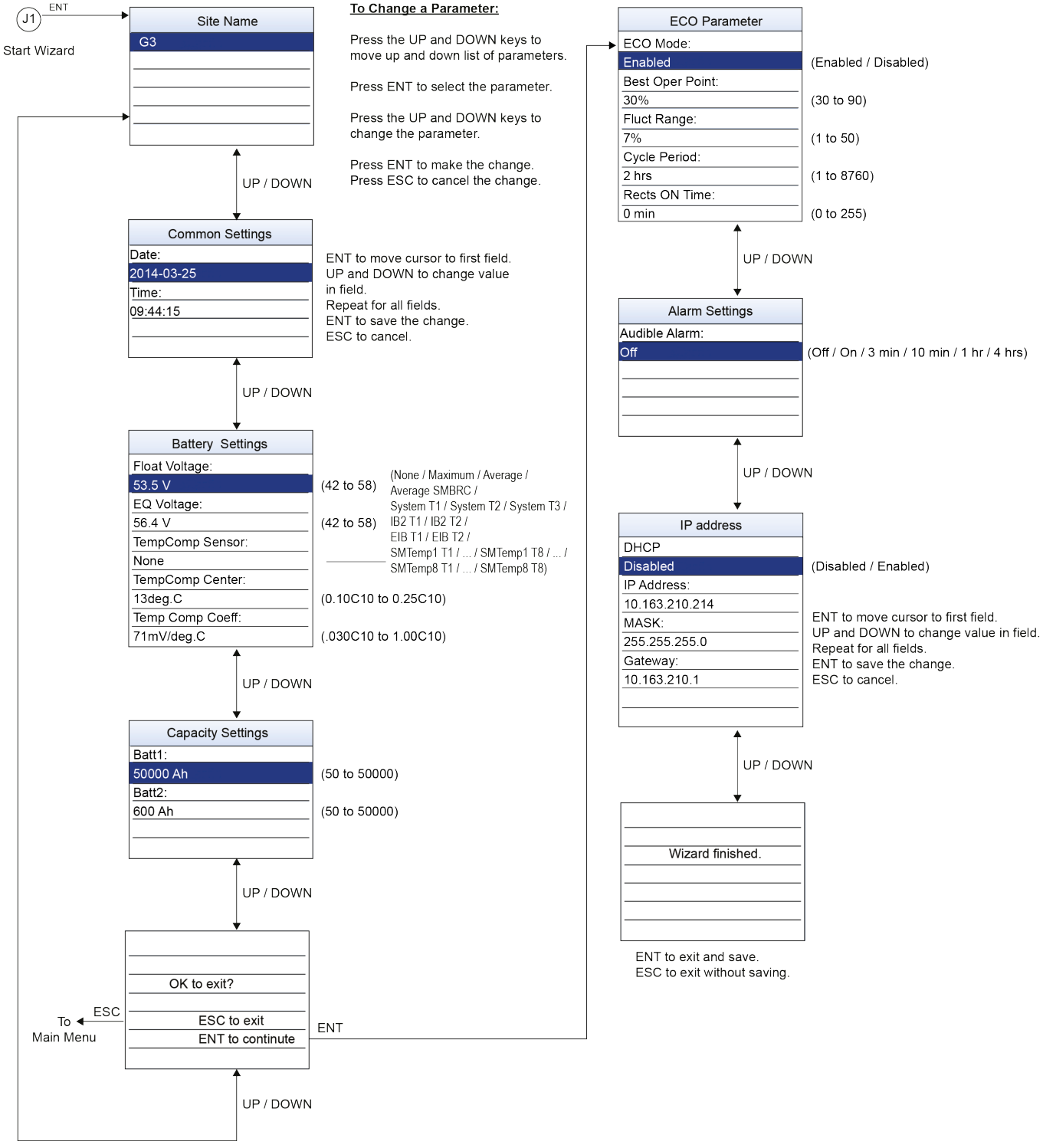
Note: Certain line items in menu or menus themselves appear if system is equipped with function or function is enabled.

The parameter values shown in ( ) are the adjustment range or acceptable values. Factory default settings are listed in the NCU Configuration Drawing (C-dwg) furnished with your system.

Start Wizard Sub-Menu (accessed from Settings Menu)

The Start Wizard menu can be accessed from the Settings Menu as shown in Figure 14.

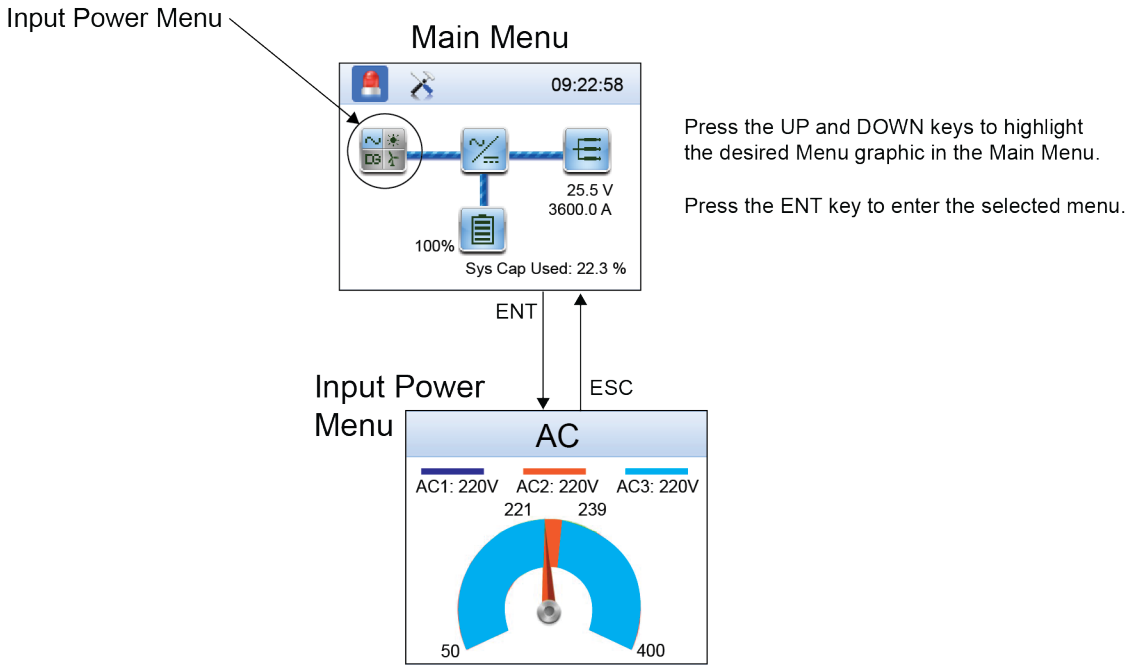
Figure 14. Start Wizard Sub-Menu (accessed from Setting's Menu)



Input Power Menu

The Input Power Menu can be accessed from the Main Menu as shown in Figure 15.

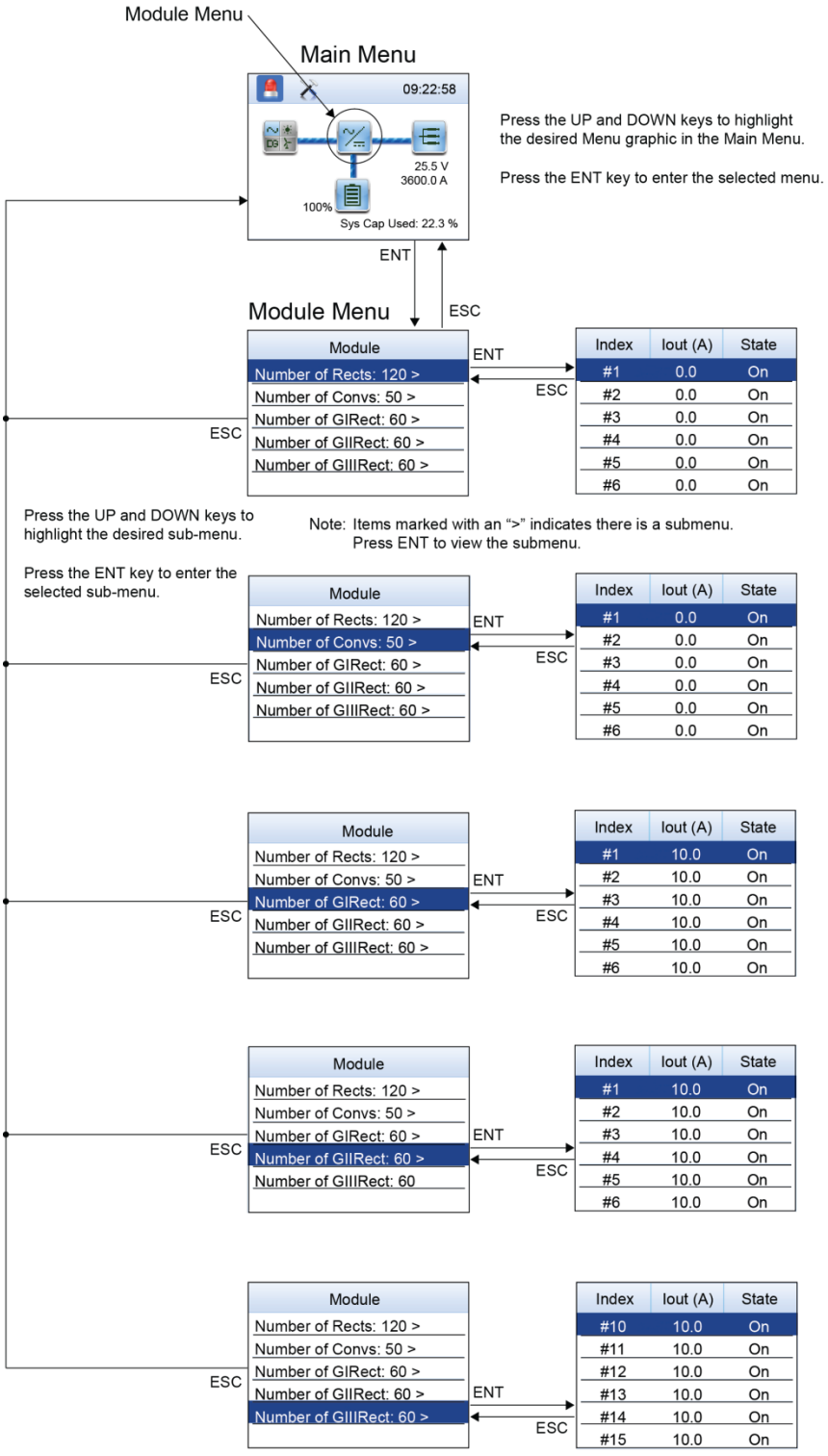
Figure 15. Input Power Menu



Module Menu

The Module Menu can be accessed from the Main Menu as shown in Figure 16.

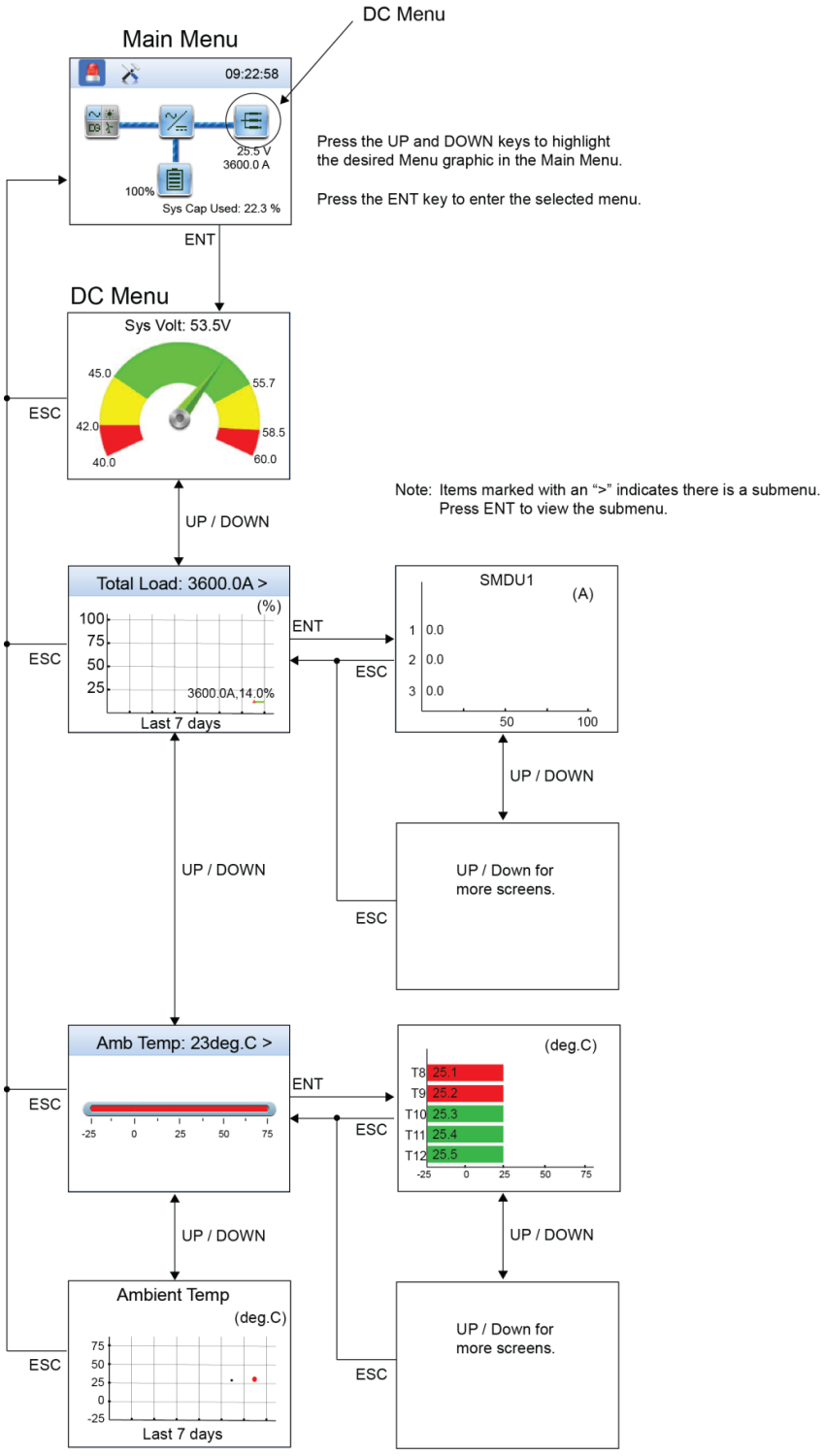
Figure 16. Module Menu


Module Menu
Main Menu
09:22:58
25.5 V
3600.0 A
100%
Sys Cap Used: 22.3 %
Press the UP and DOWN keys to highlight the desired Menu graphic in the Main Menu.
Press the ENT key to enter the selected menu.
ENT
ESC
Module Menu
Module
Number of Rects: 120 >
Number of Convs: 50 >
Number of GIRect: 60 >
Number of GIIRect: 60 >
Number of GIIIRect: 60 >
Index
Iout (A)
State
#1 0.0 On
#2 0.0 On
#3 0.0 On
#4 0.0 On
#5 0.0 On
#6 0.0 On
Press the UP and DOWN keys to highlight the desired sub-menu.
Press the ENT key to enter the selected sub-menu.
Note: Items marked with an ">" indicates there is a submenu.
Press ENT to view the submenu.
Number of GIIRect: 60 >
Number of GIIIRect: 60
#10 10.0 On
#11 10.0 On
#12 10.0 On
#13 10.0 On
#14 10.0 On
#15 10.0 On

DC Menu

The DC Menu can be accessed from the Main Menu as shown in Figure 17.

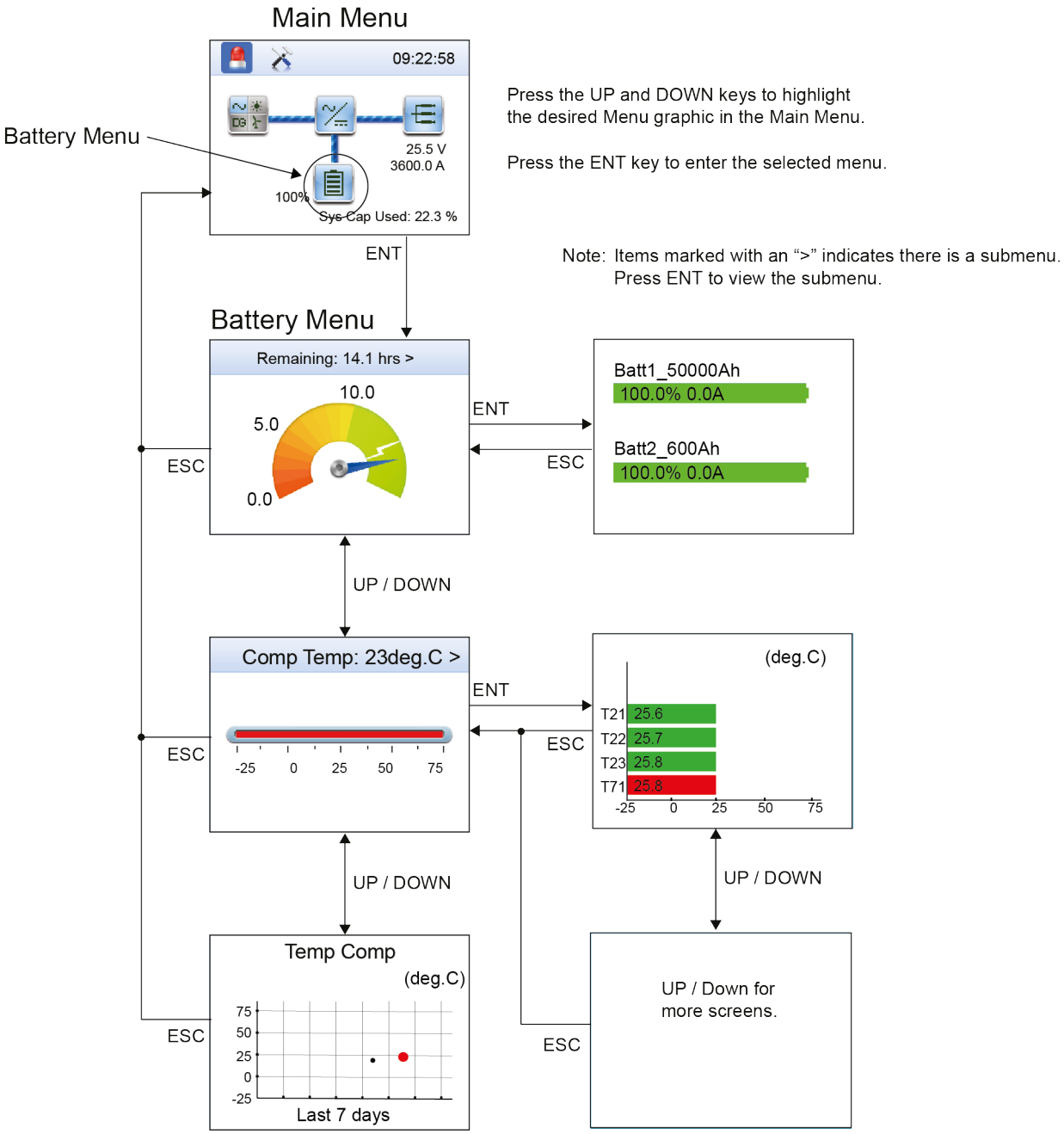
Figure 17. DC Menu



Battery Menu

The Battery Menu can be accessed from the Main Menu as shown in Figure 18.

Figure 18. Battery Menu



Description of Local Display Menus Programmable Parameters

The following are descriptions of the programmable parameters presented in the local display menus.

Settings Menu

See Figure 13.

MAINTENANCE SUB-MENU

- **Auto/Man State:**
  - **Auto:** The controller automatically controls the power system.
  - **Manual:** A User can manually change certain power system control settings. When you return to Auto Mode, any settings changed in Manual Mode are returned to their previous setting (setting before being placed in Manual Mode). This provides a convenient means of making temporary adjustment changes for testing purposes.
- **EQ/FLT Control:** Places the system in Equalize Charge or Float Charge mode.
- **LVD1 Control:** Temporarily connects or disconnects LVD 1 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **LVD2 Control:** Temporarily connects or disconnects LVD 2 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **BattTestControl:** Starts or stops battery test.

ENERGY SAVING SUB-MENU

- **ECO Mode:** Enables or disables the Energy Optimization Mode feature for all rectifiers. When enabled, the following parameters can be set.
- **Best Oper Point:** Percent of full load capacity that the rectifiers operate under in the Energy Optimization mode.
- **Fluct Range:** If load fluctuation is less than this value, rectifiers are not turned on or off for Energy Optimization.
- **Cycle Period:** This is the time period that rectifiers are turned on and off to maintain an equal operating time for all rectifiers in the system.
- **Rects ON Time:** Time all rectifiers are turned on at the end of the “Cycle Period”.

ALARM SETTINGS SUB-MENU

- **Audible Alarm:** Programs the audible alarm feature.
  - **Off:** Disables the audible alarm.
  - **On:** When a new alarm occurs, the audible alarm sounds. Press any key to silence the audible alarm.
  - **3 min / 10 min / 1 hr / 4 hrs:** When a new alarm occurs, the audible alarm sounds. The audible alarm automatically silences after the selected time period.
- **Alarm Blocked:**
  - **Normal:** Alarms are processed normally.
  - **Blocked:** Forces the alarm relays in the "off" state and blocks alarms from changing the relay state.
- **ClrRectCommFail:** Clears a rectifier communication fail alarm.
- **Clear Rect Lost:** Clears a rectifier lost alarm.
- **Clr Bad Bat Alm:** Clears a bad battery alarm.
- **ClrBatTestFail:** Clears a battery test fail alarm.
- **Reset Cycle Alm:** Clears a rectifier oscillator alarm.
- **Clr AbnlCur Alm:** Clears an abnormal current alarm.
- **Clr Cur Imb Alm:** Clears a current imbalance alarm.
- **ClrConvComm Fail:** Clears a converter communication fail alarm.
- **Clear Conv Lost:** Clears a converter lost alarm.
- **ClearSolarLost:** Clears a solar converter lost alarm.
- **Rst RectGrpLost:** Resets rectifier group lost alarms.

RECT SETTINGS SUB-MENU

- **Current Limit:** Enables or disables adjusting the output current limit point.

  Note: *By default this is set to disabled. When disabled, rectifier current limit is set in the rectifier (not via the NCU) at the maximum current limit point.*
- **Curr Limit Pt:** Sets the output current limit point for all rectifiers combined when the “Current Limit” setting above is set to enabled.
- **Walk-In:** Enables or disables the start-up walk-in feature for all rectifiers.

- **Walk-In Time:** Sets the start-up walk-in time when the "Walk-In" setting above is set to enabled.
- **Start Interval:** Sets the sequence start interval (time period between starting each rectifier in the system).

BATT SETTINGS SUB-MENU

The BATT SETTINGS sub-menu consists of following sub-menus.

Basic Settings Sub-Menu

- **Num Batt Shunts:** Sets the number of battery shunts in the system.

Charge Sub-Menu

- **Float Voltage:** Float Charge output voltage setting.
- **EQ Voltage:** Equalize Charge output voltage setting.
- **Batt Curr Limit:** Maximum battery charging current setting. For example, a value of 0.150C10 means that the charging current is limited to 15% of the battery's nominal capacity.
- **Over Curr Lmt:** Battery over current alarm setting. For example, a value of 0.300C10 means that when the charging current reaches 30% of the battery's nominal capacity, an alarm will be extended.
- **Auto EQ:** Enables or disables the Automatic Equalize Charge feature. The following parameters need to be set via the Web Interface.
  - **EQ Start Curr:** The system is transferred to Equalize Charge mode when battery charge current increases to this setting. For example, a value of 0.060C10 means that an Automatic Equalize is started if the battery charge current is greater than 6% of the battery's nominal capacity.
  - **EQ Start Cap:** The system is transferred to Equalize Charge mode when remaining battery capacity decreases to this setting.
  - **EQ Stop Curr:** When in Equalize Charge mode and the battery charge current decreases below this setting for the "EQ Stop Delay" time period, the system is transferred to Float Charge mode. For example, a value of 0.010C10 means that when the charging current is less than 1% of the battery's nominal capacity, the system returns to the Float mode.
  - **EQ Stop Delay:** See "EQ Stop Curr" above.

Note: *If the power system has been automatically placed in Equalize mode, disabling Auto EQ will* ***not*** *return the system to Float mode until the current Equalize cycle is completed. To return immediately to Float mode, navigate as follows: Main Menu / Settings Icon / Maintenance / "EQ/FLT Control", and select Float Charge.*

  - **Maximum EQ Time:** This is the maximum duration, in minutes, that an Automatic Equalize Charge will last regardless of the other settings.
  - **Cyc EQ:** Enables or disables cyclic (scheduled) Equalize charging. When enabled, the following parameters can be set.
  - **Cyc EQ Interval:** Cyclic (scheduled) Equalize charging interval.
  - **Cyc EQ Duration:** Cyclic (scheduled) Equalize charging duration.

Battery Test Sub-Menu

- **End Test Volt:** This is the "end of test voltage level" for battery discharge tests. A battery discharge test will end if battery voltage decreases to this setting.
- **End Test Time:** This is the "end of test time period" for battery discharge tests. A battery discharge test will end if this time period is exceeded.
- **EndTestCapacity:** This is the "end of test remaining battery capacity" for battery discharge tests. A battery discharge test will end if remaining battery capacity decreases to this setting. For example, a value of 0.700C10 means that when the discharging current reaches 70% of the battery's nominal capacity, the battery test is ended.

Temp Comp Sub-Menu

- **TempComp Sensor:** Select "None" for no temperature compensation, or the temperature probe (System T1, System T2, System T3, IB2 T1, IB2 T2, EIB T1, EIB T2, SMTemp1 T1, ..., SMTemp1 T8, SMTemp8 T1, ..., SMTemp8 T8) sensing battery temperature for temperature compensation. You can also select Maximum or Average which takes the maximum or average reading of the temperature probes (any of System T1, System T2, System T3, IB2 T1, IB2 T2, EIB T1, EIB T2, SMTemp1 T1, ..., SMTemp1 T8, SMTemp8 T1, ..., SMTemp8 T8) set as battery temperature probes. When used with an SM-BRC, you can select to average the SM-

BRC temperature probe readings (Average SMBRC setting).

Note: The temperature compensation sensor is also the sensor which displays the battery temperature on the Web Interface's Homepage.

- **TempComp Center:** Sets the temperature at which the system operates at normal voltage levels.
- **Temp Comp Coeff:** Sets the temperature compensation slope or rate of change per °C above or below the "TempComp Center" setting. This value is expressed in millivolt per °C per string (mV/°C/str). For example, for a rate of change of 72 mV/°C/str in a 24-cell 48V nominal battery string, the rate of change is 3 mV per cell.
- **Temp Comp Clamp:** Enables or disables the temperature compensation voltage clamp feature.
- **Temp Comp Max V:** Upper voltage limit where battery temperature compensation clamps the voltage.
- **Temp Comp Min V:** Lower voltage limit where battery temperature compensation clamps the voltage.

Batt1 Settings Sub-Menu

- **Shunt Current:** Enter the battery string's shunt current rating.
- **Shunt Voltage:** Enter the battery string's shunt voltage rating.
- **Rated Capacity:** Enter the battery string's rated capacity.

Batt2 Settings Sub-Menu

- **Shunt Current:** Enter the battery string shunt's current rating.
- **Shunt Voltage:** Enter the battery string shunt's voltage rating.
- **Rated Capacity:** Enter the battery string's rated capacity.

LVD SETTINGS SUB-MENU

- **HTD Point:** Sets high temperature limit at which LVD1 and/or LVD2 contactors will open (disconnect) if the HTD1 and/or HTD2 features are enabled. If this temperature is reached, a disconnect occurs regardless of voltage.
- **HTD Recon Point:** Sets temperature at which a reconnect will occur following a High Temperature Disconnect.
- **LVD 1:** Enables or disables LVD1.
- **LVD 1 Mode:** Sets LVD1 to disconnect on a voltage or time setpoint.
- **LVD 1 Disc Volt:** LVD1 low voltage disconnect setting (when LVD set for voltage).
- **LVD1 Recon Volt:** LVD1 reconnect setting (when LVD set for voltage).
- **LVD 1 Time:** The time period before LVD1 disconnection once an AC fail condition occurs (when LVD set for time).
- **LVD 1 HTD:** Enables or disables the High Temperature 1 Disconnect feature. This feature causes LVD1 contactors to open (disconnect) if a high temperature event occurs.
- **LVD 2:** Enables or disables LVD2.
- **LVD 2 Mode:** Sets LVD2 to disconnect on a voltage or time setpoint.
- **LVD 2 Disc Volt:** LVD2 low voltage disconnect setting (when LVD set for voltage).
- **LVD 2 Recon Volt:** LVD2 reconnect setting (when LVD set for voltage).
- **LVD 2 Time:** The time period before LVD2 disconnection once an AC fail condition occurs (when LVD set for time).
- **LVD 2 HTD:** Enables or disables the High Temperature 2 Disconnect feature. This feature causes LVD2 contactors to open (disconnect) if a high temperature event occurs.

AC SETTINGS SUB-MENU

- **Nominal AC Volt:** Enter the nominal line-to-neutral voltage (single phase rectifier) or nominal line-to-line voltage (three phase rectifier).
- **Mains Fail Alm1:** Sets the Mains Fail Alarm 1 value (percent of nominal).
- **Mains Fail Alm2:** Sets the Mains Fail Alarm 2 value (percent of nominal).

Corresponding Alarms:

- Phase A Voltage Low 1 (Nominal Minus "Mains Fail Alarm 1 Percent of Nominal)
- Phase A Voltage Low 2 (Nominal Minus " Mains Fail Alarm 2 Percent of Nominal)
- Phase A Voltage High 1 (Nominal Plus " Mains Fail Alarm 1 Percent of Nominal)
- Phase A Voltage High 2 (Nominal Plus "V Mains Fail Alarm 2 Percent of Nominal)

Phase A used in the example above, Phase B and Phase C are similar.

SYS SETTINGS SUB-MENU

- **Over Voltage 1:** Sets the Over Voltage 1 alarm point.
- **Over Voltage 2:** Sets the Over Voltage 2 alarm point.
- **Under Voltage 1:** Sets the Under Voltage 1 alarm point.
- **Under Voltage 2:** Sets the Under Voltage 2 alarm point.
- **LCD Language:** Select the language the menus are displayed in.
- **Keypad Voice:** Sets the keypad sound on or off.
- **Date:** Sets the date. Refer to "Changing the Date" on page 20 for a procedure to change the date.
- **Time:** Sets the time. Refer to "Changing the Time" on page20 for a procedure to change the time.
- **LCD Rotation:** Sets the rotation of the text in the menus (allowing the controller to be mounted in any of four orientations).

  Note: *The controller provides a local User interface with a 128 x 128 dot matrix LCD or 128 x 64 dot matrix LCD, only the 128x128 dot matrix has LCD Rotation function.*

- **Restore Default:** Restores the controller's default settings.
- **Update App:** Updates the controller's application.

COMM SETTINGS SUB-MENU

- **Protocol:** You can select "EEM", "YDN 23", or "Modbus" as the protocol.
- **DHCP:** The DHCP function allows the controller to acquire an IP address automatically. This function can only be enabled or disabled via the local LCD display and keypad. If this function is enabled and the acquisition of an IP address fails, an alarm is generated. If the acquisition of an IP address is successful, you need to record the IP address automatically acquired by the controller to access the controller via the Web Interface. This IP address is displayed in the IP Address field below the DHCP setting in the local display menu (Main Menu / Settings Icon / Comm Settings).
- **IP Address:** Sets the controller's IP address. Enter the address in the format nnn.nnn.nnn.nnn, where $0 \le nnn \le 255$. The address must be a valid address and must not be 255.255.255.255.
- **Mask:** Sets the controller's network netmask. Enter the address in the format nnn.nnn.nnn.nnn, where $0 \le nnn \le 255$.
- **Gateway:** Sets the controller's gateway address. Enter the address in the format nnn.nnn.nnn.nnn, where $0 \le nnn \le 255$. This is the address of the gateway of the network on which the controller resides. The address must be a valid address and must not be 255.255.255.255.

OTHER SETTINGS SUB-MENU

- **Rect Expansion:**
  - **Inactive:** Select this option if this is the only NCU controller in the power system.
  - **Primary:** Select this option if the power system consists of multiple bays with multiple NCU controllers, and this NCU controller is to be the primary controller. Note that only one (1) NCU controller can be set as the primary controller.
  - **Secondary:** Select this option if the power system consists of multiple bays with multiple NCU controllers, and this NCU controller is to be a secondary controller.
  - **Address:** Sets the address of an NCU controller set as a secondary controller.

Note: *When primary or secondary is selected, the NCU will start auto configure. This process will take more than three (3) minutes.*

Primary/Secondary Procedure:

Up to four (4) NCU controllers can be connected together when a power system requires a greater number of rectifiers than can be controlled by a single NCU controller. One (1) controller is designated as the primary controller, the others as secondary controllers. The rectifiers controlled by the secondary controllers are designated as RectifierGroup 2 through 4 in the menus.

Note: *Changing the Rectifier Expansion setting may take more than three (3) minutes for the NCU to configure the feature.*

1. Connect the NCU controllers in the multiple bays via the RS485 interface.
2. Set one of the NCU controllers as the primary controller via the "Rect Expansion" menu item in the OTHER SETTINGS menu.

3. Set all other NCU controllers as secondary controllers via the “Rect Expansion” menu item in the OTHER SETTINGS menu.
4. Set the Address of the NCU controllers set as secondary controllers to 201, 202, or 203 via the “Address” menu item in the OTHER SETTINGS menu. Note that each secondary controller must be set to a different address.

- **Auto Config:** Auto configures the controller for the devices connected to it.
- **LCD Display Wizard:** Selects to run the Start Wizard after the controller is restarted. Refer to the next section and Figure 14.
- **Start Wizard Now** (see Figure 14).

Site Name Sub-Menu

Enter the site name and other site information.

Common Settings Sub-Menu

Date: Sets the date. Refer to “Changing the Date” on page 20 for a procedure to change the date.

Time: Sets the time. Refer to “Changing the Time” on page20 for a procedure to change the time.

Battery Settings Sub-Menu

Float Voltage: Float Charge output voltage setting.

EQ Voltage: Equalize Charge output voltage setting.

TempComp Sensor: Select "None" for no temperature compensation, or the temperature probe (System T1, System T2, System T3, IB2 T1, IB2 T2, EIB T1, EIB T2, SMTemp1 T1, ..., SMTemp1 T8, SMTemp8 T1, ..., SMTemp8 T8) sensing battery temperature for temperature compensation. You can also select Maximum or Average which takes the maximum or average reading of the temperature probes (any of System T1, System T2, System T3, IB2 T1, IB2 T2, EIB T1, EIB T2, SMTemp1 T1, ..., SMTemp1 T8, SMTemp8 T1, ..., SMTemp8 T8) set as battery temperature probes. When used with an SM-BRC, you can select to average the SM-BRC temperature probe readings.

Note: *The temperature compensation sensor is also the sensor which displays the battery temperature on the Web Interface’s Homepage.*

TempComp Center: Sets the temperature at which the system operates at normal voltage levels.

Temp Comp Coeff: Sets the temperature compensation slope or rate of change per °C above or below the "Temp Comp" setting. This value is expressed in millivolt per °C per string (mV/°C/str). For example, for a rate of change of 72 mV/°C/str in a 24-cell 48V nominal battery string, the rate of change is 3 mV per cell.

Capacity Settings Sub-Menu

Batt1: Enter the battery string’s rated capacity.

Batt2: Enter the battery string’s rated capacity.

OK to Exit?

Press ESC to end the wizard or press ENT to continue the wizard to enter the following parameters.

ECO Parameter Sub-Menu

ECO Mode: Enables or disables the Energy Optimization Mode feature for all rectifiers. When enabled, the following parameters can be set.

Best Oper Point: Percent of full load capacity that the rectifiers operate under in the Energy Optimization mode.

Fluct Range: If load fluctuation is less than this value, rectifiers are not turned on or off for Energy Optimization.

Cycle Period: This is the time period that rectifiers are turned on and off to maintain an equal operating time for all rectifiers in the system.

Rects ON Time: Time all rectifiers are turned on at End of Cycle.

Alarm Settings Sub-Menu

Audible Alarm: Programs the audible alarm feature.

Off: Disables the audible alarm.

On: When a new alarm occurs, the audible alarm sounds. Press any key to silence the audible alarm.

3 min / 10 min / 1 hr / 4 hrs: When a new alarm occurs, the audible alarm sounds. The audible alarm automatically silences after the selected time period.

IP Address Sub-Menu

DHCP: The DHCP function allows the controller to acquire an IP address automatically. This function can only be enabled or disabled via the local LCD

display and keypad. If this function is enabled and the acquisition of an IP address fails, an alarm is generated. If the acquisition of an IP address is successful, you need to record the IP address automatically acquired by the controller to access the controller via the Web Interface. This IP address is displayed in the IP Address field below the DHCP setting in the local display menu (Main Menu / Settings Icon / Comm Settings).

IP Address: Sets the controller's IP address. Enter the address in the format nnn.nnn.nnn.nnn, where 0 ≤ nnn ≤ 255. The address must be a valid address and must not be 255.255.255.255.

Mask: Sets the controller's network netmask. Enter the address in the format nnn.nnn.nnn.nnn, where 0 ≤ nnn ≤ 255.

Gateway: Sets the controller's gateway address. Enter the address in the format nnn.nnn.nnn.nnn, where 0 ≤ nnn ≤ 255. This is the address of the gateway of the network on which the controller resides. The address must be a valid address and must not be 255.255.255.255.

Web Interface Screens

Overview of Web Function

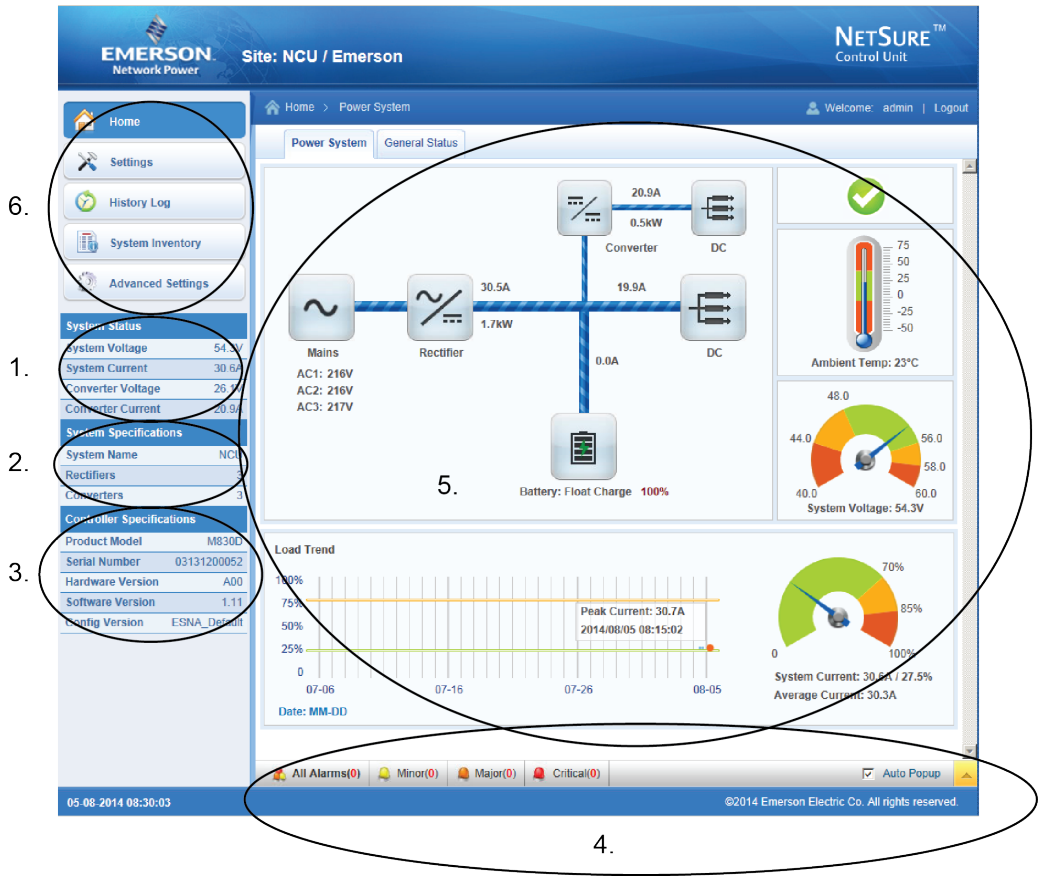
This section provides descriptions of the Web Interface Screens. Refer also to “Passwords and Privilege Levels” on page 13 and “Using the Web Interface” on page 15. For Local Display Menus, refer to “Local Display Menus” on page 67.

Note: *Best viewed at 1024 x 768 resolution.*

Homepage

In the Web Interface, after entering a valid ***User Name*** and ***Password*** and clicking ***LOGIN***, the "Homepage" window opens. See also “Logging into the Controller” on page 19.

Figure 19. NCU Homepage



The homepage window is divided into six areas:

1. System Status Information Area
2. System Specifications Information Area
3. Controller Specifications Information Area
4. Alarms Area
5. System Status Area
6. Menu Navigation Area

System Status Information Area

Output voltage and output current are displayed here.

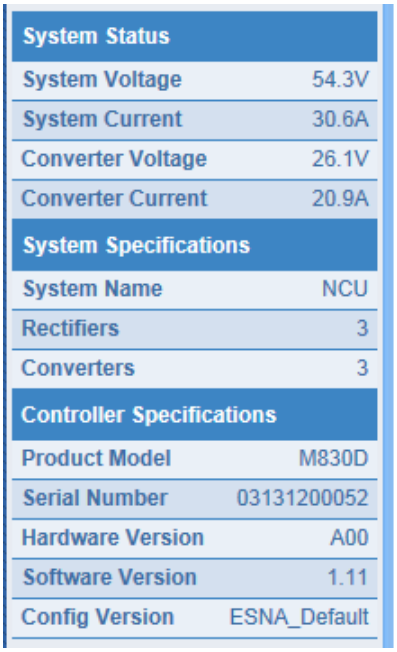
System Specifications Information Area

System specifications are displayed here.

Controller Specifications Information Area

Controller specifications are displayed here.

Figure 20. System Status Information, System Specifications Information, and Controller Specifications Information Areas

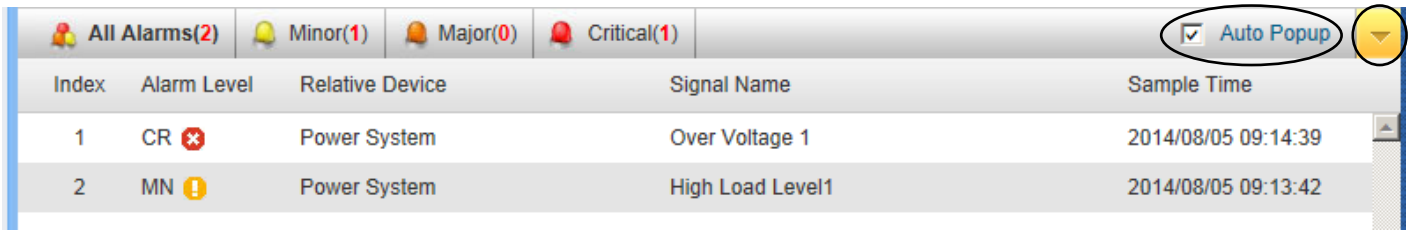


Alarms Area

Any alarms active in the power system are shown in this area.

When viewing the alarms, click the “arrow” icon to collapse the alarm list. Click the "arrow" icon to expand the alarm list. Also located next to the “arrow” icon is a check box named “Auto Popup”. When this box is checked and the alarm window is collapsed, a new alarm will cause the alarm window to expand.

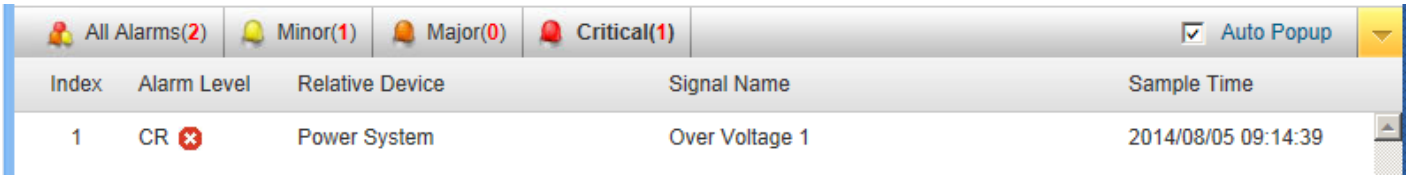
Figure 21. Alarms Area



The alarms area contains tabs to allow viewing all alarms or a type of alarm (severity). For example, click the Critical tab to display alarms set as Critical alarms.

Note: *Minor alarms are shaded yellow, major alarms are shaded orange, and critical alarms are shaded red.*

Figure 22. Critical Alarms Tab



System Status Area

System status is displayed in this area and consists of a Power System tab and a General Status tab.

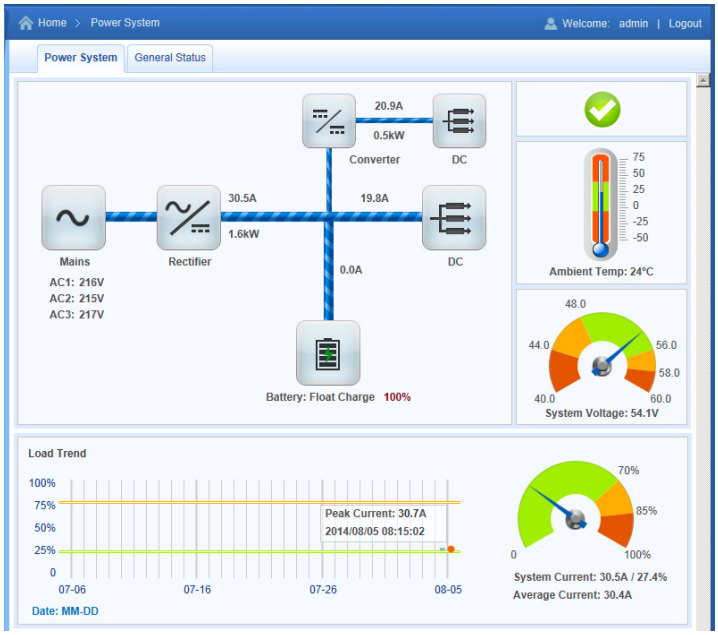
Temperature Readings

- The temperature sensor set as “Ambient Temp Sensor” is the sensor which displays the ambient temperature on the Power System tab.

POWER SYSTEM TAB

The Power System tab displays power system status in a graphical block diagram format. This includes status of the input power, modules (i.e. rectifiers, converters), DC equipment, and battery. Also displayed are alarm status, ambient temperature, output voltage, output current, average current, and a load trend chart.

Figure 23. Power System Tab



The power system status area is User interactive. Clicking on the various icons will take you to that devices status Web page. For example, clicking on the rectifier module icon opens the following Web page. This topic is further explained in the next section.

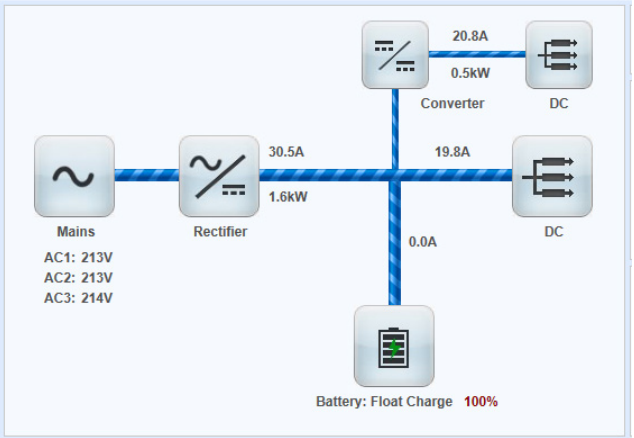
Figure 24. Rectifier Module Status Web Page

Device Group Status Pages

The power system status block diagram has interactive links. Clicking on a link takes you to that device group's status page. A device group's status page displays current or logged operating parameters for that device group.

The following sections describe the Module (i.e. rectifier, converter, solar converter), DC, and the Battery device groups as samples of how to use these links.

Figure 25. Power System Status Page Block Diagram



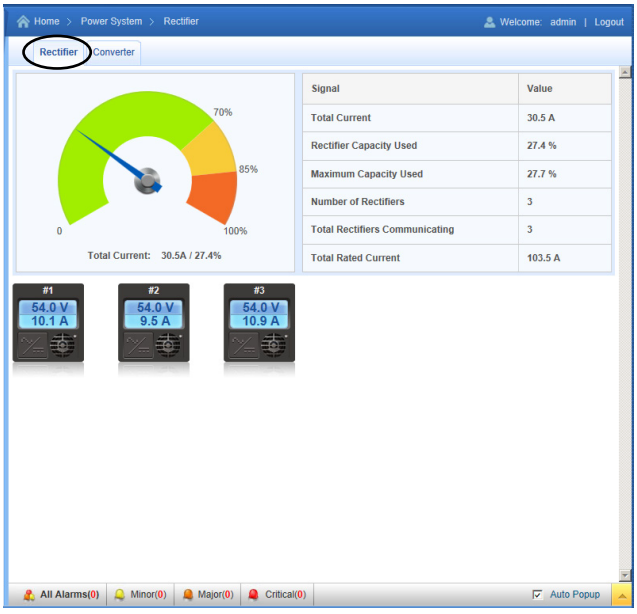
Module (Rectifier, Converter, Solar Converter) Device Group Status Page

Clicking on a rectifier, converter, or solar converter icon on the power system status block diagram opens up the status page for the module's Device Group. The Module Device Group status page contains multiple tabs (depending on the modules installed in your power system). This includes Rectifier, Converter, and Solar Converter tabs.

Rectifier Device Group Status Page Tab

This tab displays status values such as "Total Current", "Number of Rectifiers", etc.

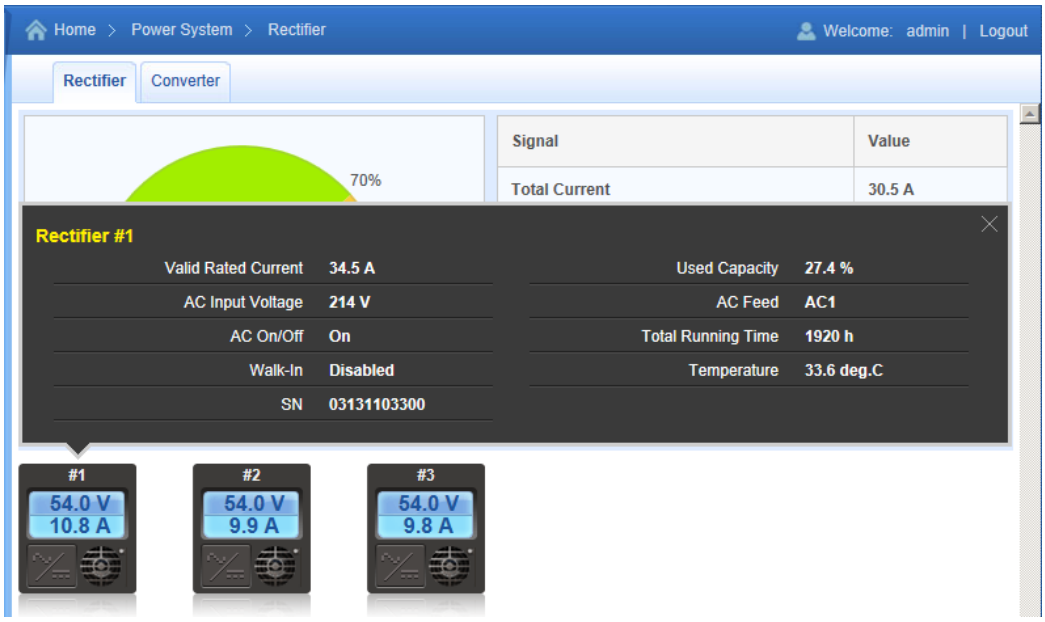
Figure 26. Rectifier Device Group Status Page Tab



Individual Rectifier Status Page

Displayed on the Rectifier Device Group status page are the individual rectifiers installed in the system. Click on an individual rectifier icon to display its status such as "Current", "Temperature", etc.

Figure 27. Individual Rectifier Status Page



Individual Rectifier Settings Page

In Figure 26, if you hover the mouse pointer on an individual rectifier icon , this icon changes to . Click to go to the individual rectifier settings page. Click to go back to the individual rectifier status page.

Figure 28. Selecting an Individual Rectifier Settings Page

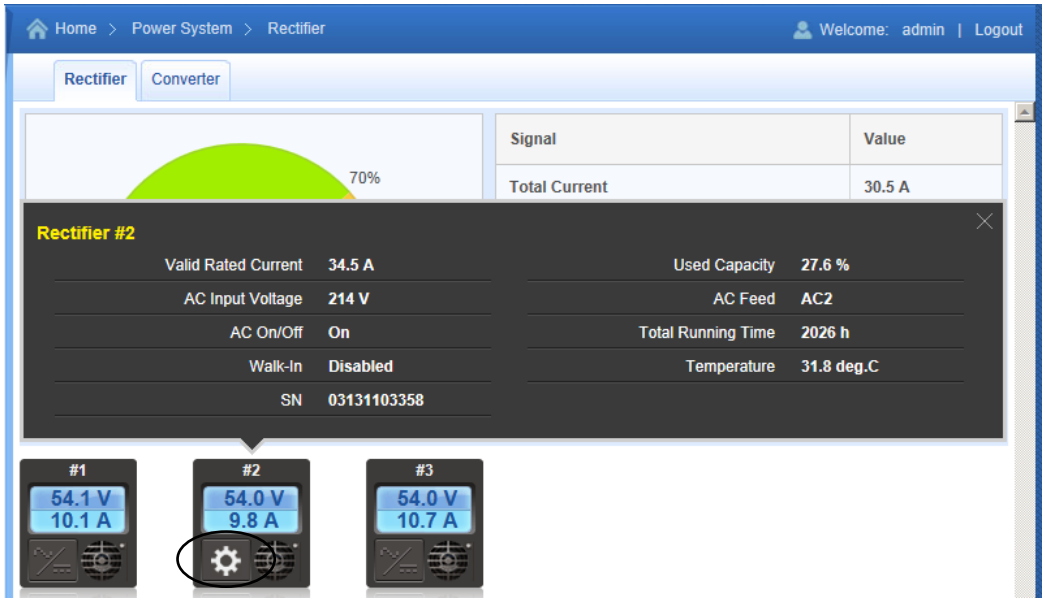
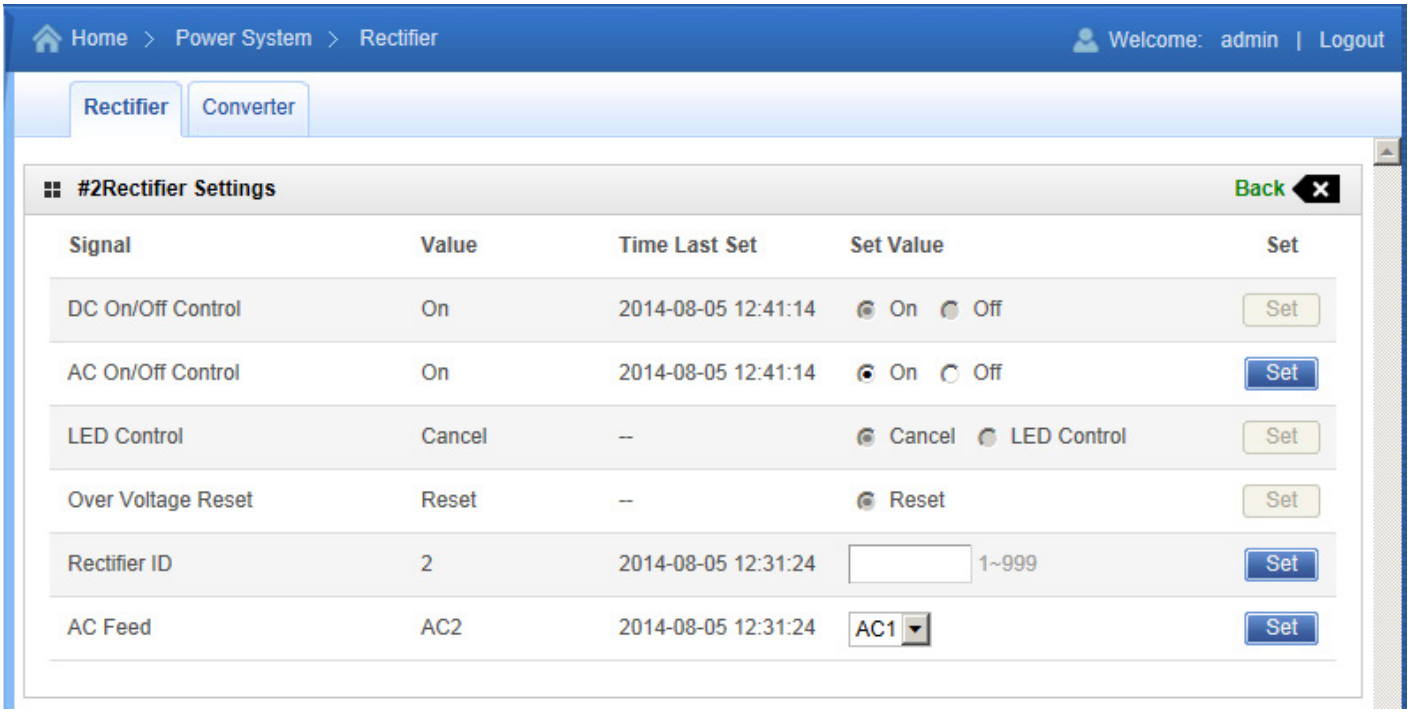


Figure 29. Individual Rectifier Settings Page



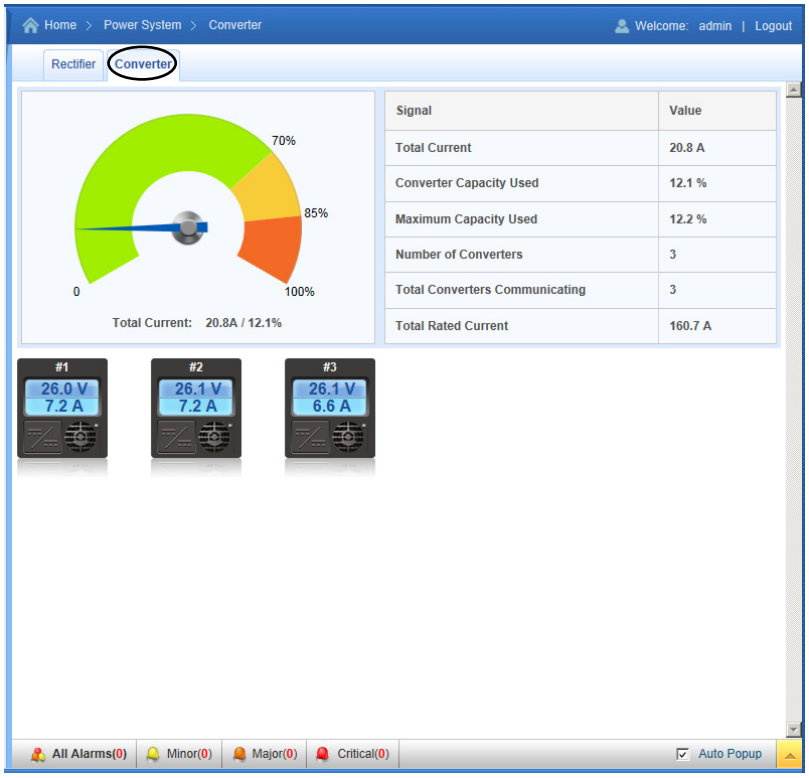
Note: *Settings that appear "grayed out" can only be made when the controller is in the "manual control" state. If the controller is set for "automatic" control, change the "Auto/Manual State" setting first to the "Manual" setting.*

- **DC On/Off Control:** Temporarily turns the rectifier's DC output on or off when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **AC On/Off Control:** Turns the rectifier's AC input on or off .
- **LED Control:** Temporarily sets whether or not the rectifier's local power indicator blinks when the controller is communicating with the rectifier when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Over Voltage Reset:** Temporarily sets the rectifier's over voltage reset feature when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Rectifier ID:** Sets the rectifier's identification number.
- **AC Feed:** Indicates the phase connected to the rectifier's input.

Converter Device Group Status Page Tab

This tab displays status values such as “Total Current”, “Number of Converters”, etc.

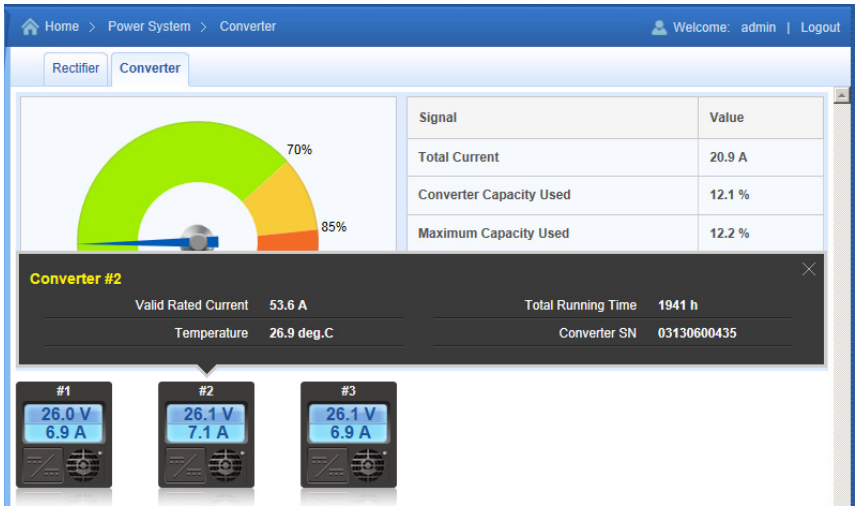
Figure 30. Converter Device Group Status Page Tab



Individual Converter Status Page

Displayed on the Converter Device Group status page are the individual converters installed in the system. Click on an individual converter icon to display its status such as "Current", "Temperature", etc.

Figure 31. Individual Converter Status Page

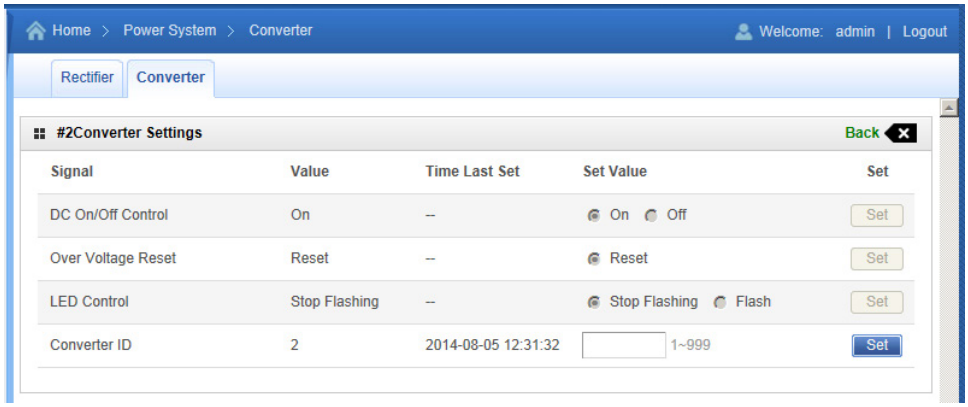


Individual Converter Settings Page

In Figure 30, hover the mouse pointer on an individual converter icon , this icon changes to . Click to go to the individual converter settings page. Click Back to go back to the individual converter status page.

Figure 32. Selecting an Individual Converter Settings Page

Figure 33. Individual Converter Settings Page



Note: *Settings that appear "grayed out" can only be made when the controller is in the "manual control" state. If the controller is set for "automatic" control, change the "Auto/Manual State" setting first to the "Manual" setting.*

- **DC On/Off Control:** Temporarily turns the converter's DC output on or off when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Over Voltage Reset:** Temporarily sets the converter's over voltage reset feature when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **LED Control:** Temporarily sets whether or not a converter's local power indicator blinks when the controller is communicating with the converter when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Converter ID:** Sets the converter's identification number.

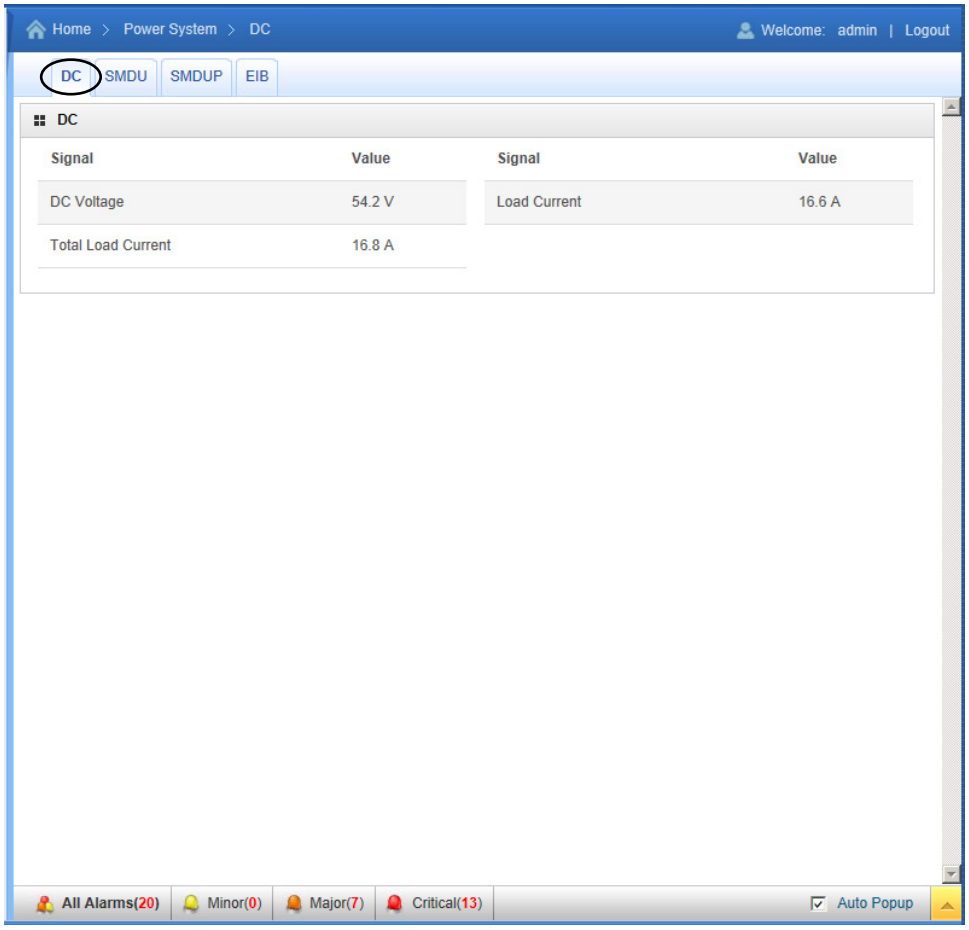
DC Device Group Status Page

Clicking on the DC icon on the power system status block diagram opens up the status page for the DC Device Group. The DC Device Group status page contains multiple tabs (depending on the DC equipment installed in your power system). This includes DC, SMDU, SMDUP, and EIB. The DC status page tab is shown next for an example.

DC Status Tab

This tab displays status values such as "DC Voltage" and "Total Load Current".

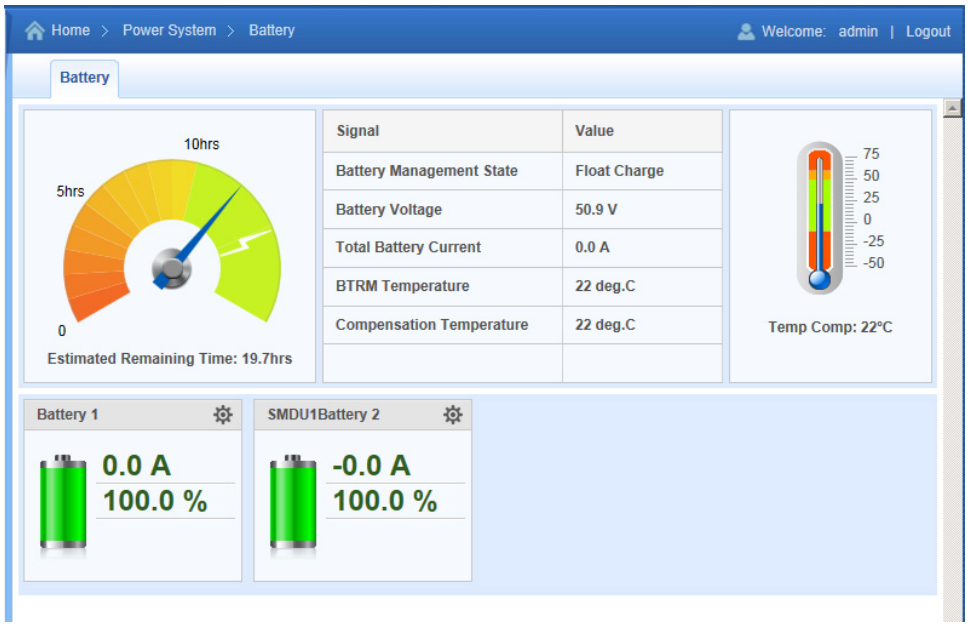
Figure 34. DC Device Group Status Tab



Battery Device Group Status Page

Clicking on the battery icon on the power system status block diagram opens up the status page for the Battery Device Group. The Battery Device Group status page displays battery status values such as "Estimated Remaining Time", "Battery Management State", and "Battery Temp".

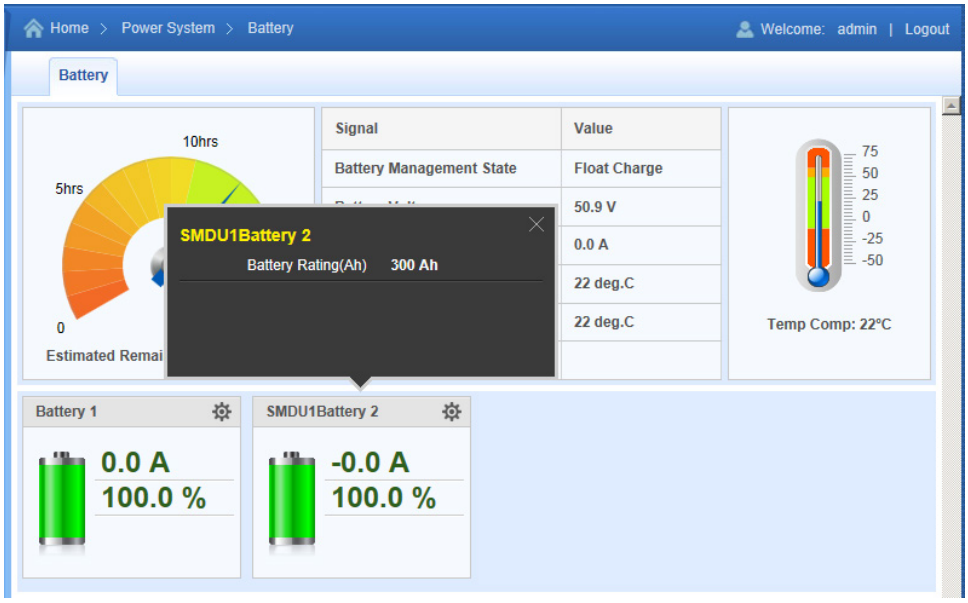
Figure 35. Battery Device Group Status Page



Individual Battery Status Page

Displayed on the Battery Device Group status page are the individual batteries installed in the system. Hover the mouse over an individual battery icon to display its status such as "Battery Rating".

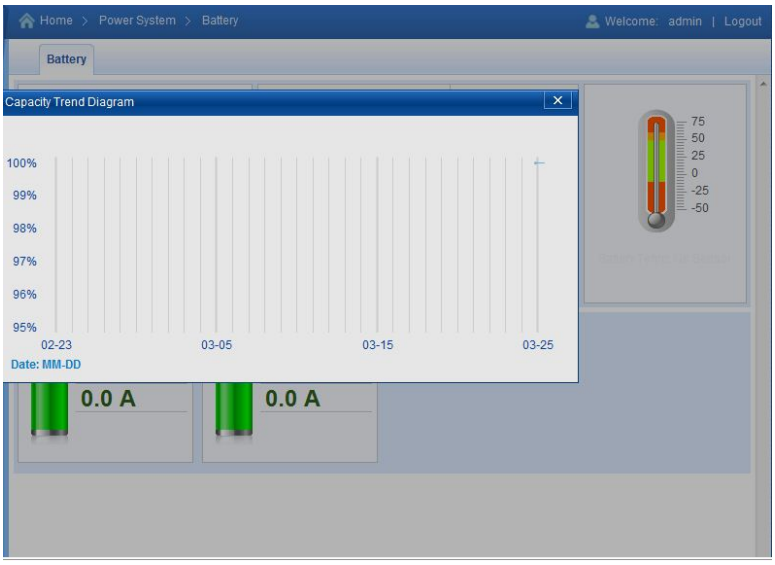
Figure 36. Individual Battery Status Page



Individual Battery Capacity Trend Diagram

Displayed on the Battery Device Group status page are the individual batteries installed in the system. Click on an individual battery (Battery 1 or Battery 2) to display its "Capacity Trend Diagram".

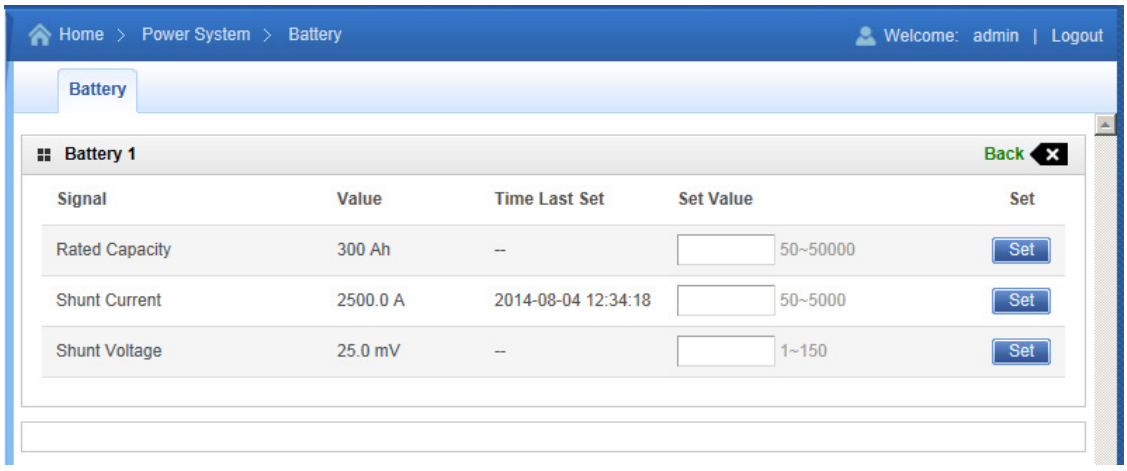
Figure 37. Individual Battery Capacity Trend Diagram



Individual Battery Settings Page

In Figure 35, click on the symbol located on an individual battery icon to go to the individual battery settings page. Click Back to go back to the individual battery status page.

Figure 38. Individual Battery Settings Page



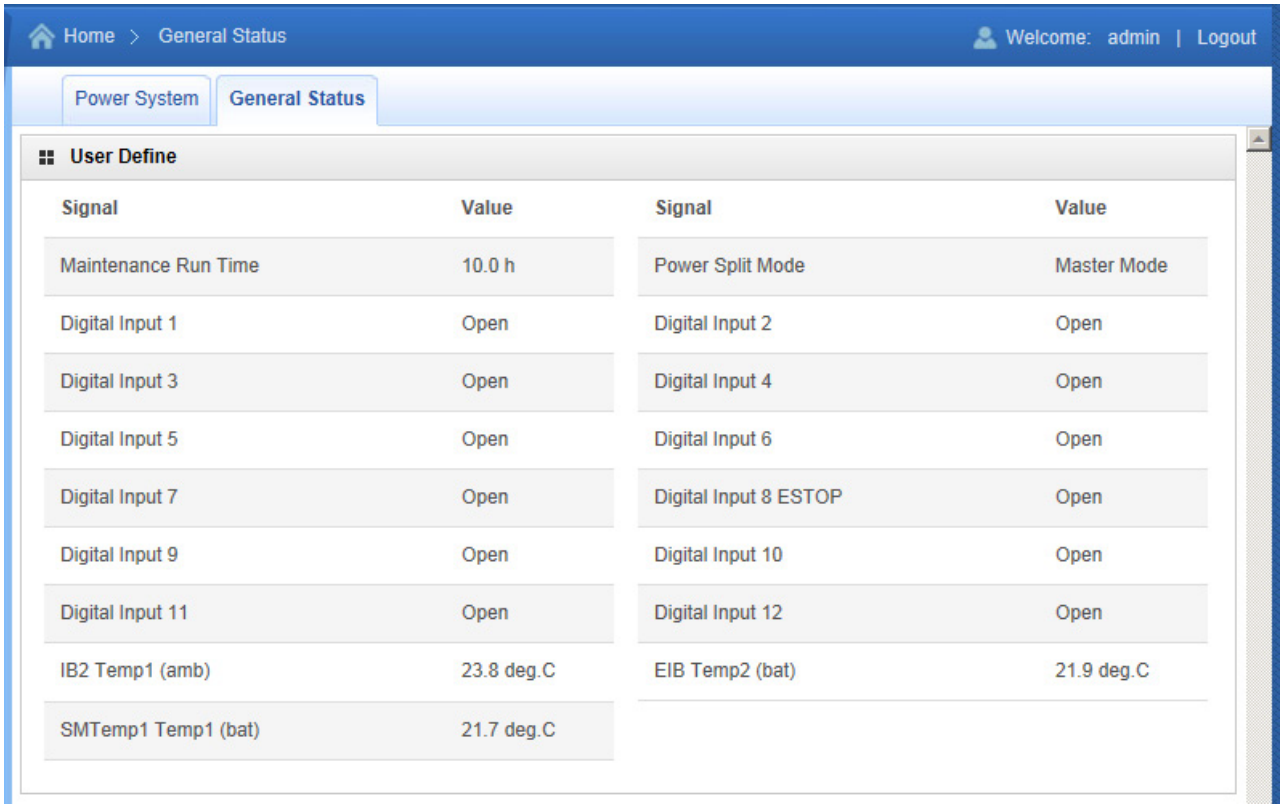
- **Rated Capacity:** Enter the battery string's rated capacity.
- **Shunt Current:** Enter the battery string's shunt current rating.
- **Shunt Voltage:** Enter the battery string's shunt voltage.

GENERAL STATUS TAB

The General Status tab displays general status information as shown in the following illustration.

Note: *Temperature items are displayed only if temperature probes are connected.*

Figure 39. General Status Tab

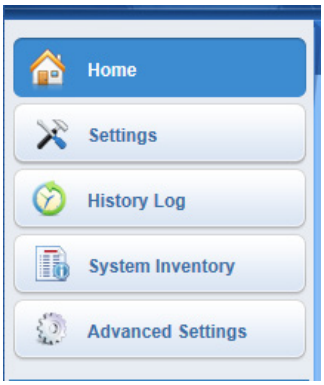


Signal	Value	Signal	Value
Maintenance Run Time	10.0 h	Power Split Mode	Master Mode
Digital Input 1	Open	Digital Input 2	Open
Digital Input 3	Open	Digital Input 4	Open
Digital Input 5	Open	Digital Input 6	Open
Digital Input 7	Open	Digital Input 8 ESTOP	Open
Digital Input 9	Open	Digital Input 10	Open
Digital Input 11	Open	Digital Input 12	Open
IB2 Temp1 (amb)	23.8 deg.C	EIB Temp2 (bat)	21.9 deg.C
SMTemp1 Temp1 (bat)	21.7 deg.C		

Menu Navigation Area

Available menus are displayed in this area. When a menu is clicked on, the system status screen is replaced with the selected menu's screen. Note that there is a menu item named HOME to return to the system status screen.

Figure 40. Menu Navigation Area



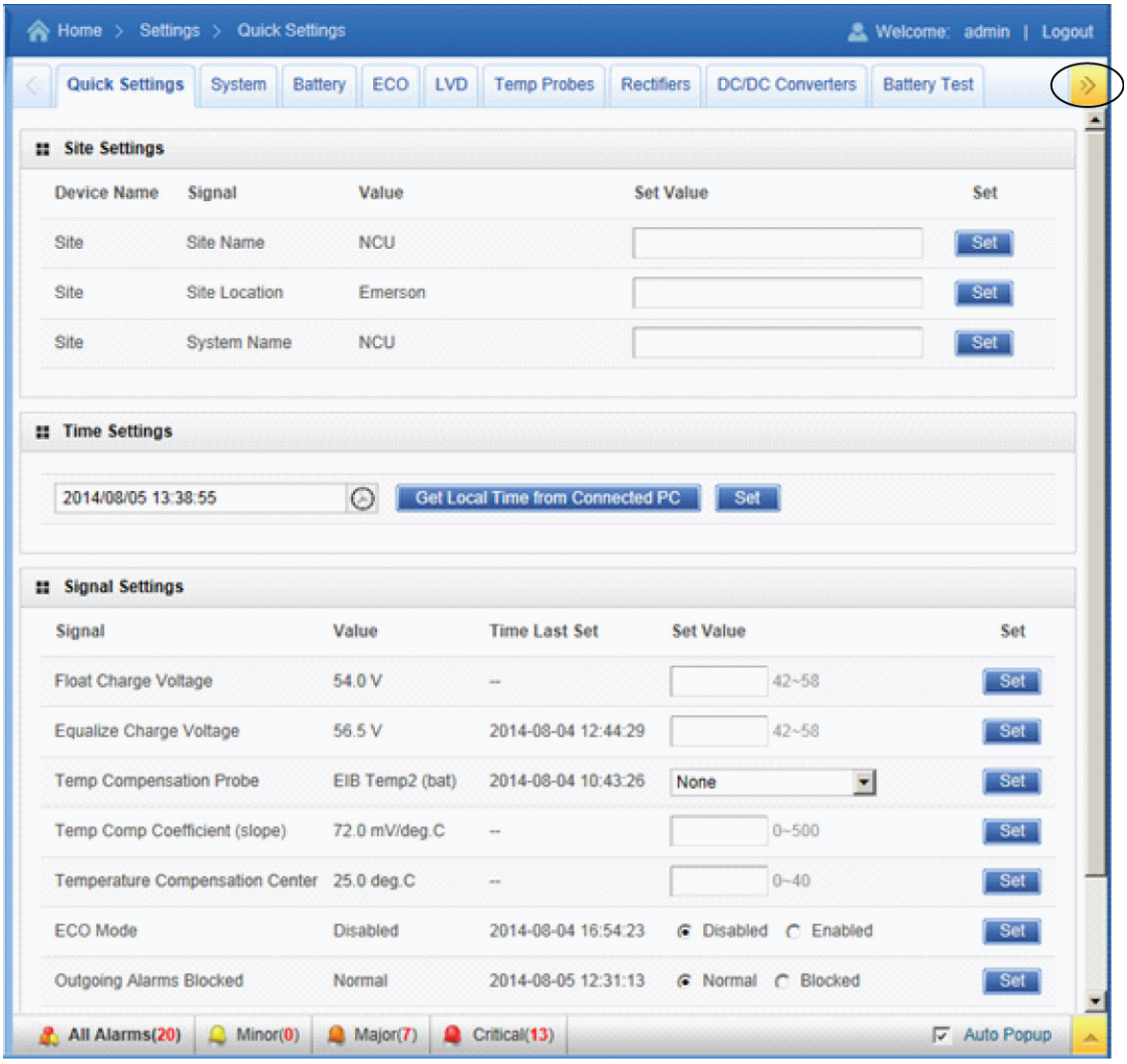
SETTINGS MENU

The Settings Menu allows you to change (if you have the proper privilege level programmed in your User settings) the settings of the various programmable parameters. Settings are grouped per function. Select a tab in the Settings Menu to change that function's programmable parameters.

An orange "arrow" icon or indicates there are additional tabs. Click the orange "arrow" icon to view the additional tabs.

Note that some parameters can be set in more than one location in the Settings Menu. The System Tab is equipment-based, while the remaining tabs are function-based. Therefore some settings will appear in both locations.

Figure 41. Settings Menu



Changing Programmable Parameters in the Settings Menu

To change a programmable parameter, select or enter a new value for the parameter then click on "Set" to change the value.

Note: *Settings that appear "grayed out" can only be made when the controller is in the "manual control" state. If the controller is set for "automatic" control, change the "Auto/Manual State" setting first to the "Manual" setting.*

Quick Settings Tab Programmable Parameter Descriptions

- **Site Settings:** Enter a "Site Name", "Site Location", and "System Name".
- **Time Settings:** Enter the time or select "Get Local Time from Connected PC".
- **Signal Settings:**
  - **Float Charge Voltage:** Float Charge output voltage setting.
  - **Equalize Charge Voltage:** Equalize Charge output voltage setting.
  - **Temp Compensation Probe:** Select "None" for no temperature compensation, or the temperature probe (System Temp1, System Temp2, System Temp3, IB2 Temp1, IB2 Temp2, EIB Temp1, EIB Temp2, SMTemp1 Temp1, ..., SMTemp1 Temp8, SMTemp8 Temp1, ..., SMTemp8 Temp8) sensing battery temperature for temperature compensation. You can also select Maximum or Average which takes the maximum or average reading of the temperature probes (any of System Temp1, System Temp2, System Temp3, IB2 Temp1, IB2 Temp2, EIB Temp1, EIB Temp2, SMTemp1 Temp1, ..., SMTemp1 Temp8, SMTemp8 Temp1, ..., SMTemp8 Temp8) set as battery temperature probes. When used with an SM-BRC, you can select to average the SM-BRC temperature probe readings (Average SMBRC setting).
  - **Temp Comp Coefficient (slope):** Sets the temperature compensation slope or rate of change per °C above or below the "Temperature Compensation Center" setting. This value is expressed in millivolt per °C per string (mV/°C/str). For example, for a rate of change of 72 mV/°C/str in a 24-cell 48V nominal battery string, the rate of change is 3 mV per cell.
  - **Temperature Compensation Center:** Sets the temperature at which the system operates at normal voltage levels.
  - **ECO Mode:** Enables or disables the Energy Optimization Mode feature for all rectifiers. When enabled, the following parameters can be set.
  - **Best Operating Point:** Percent of full load capacity that the rectifiers operate under in the Energy Optimization Mode.
  - **Load Fluctuation Range:** If load fluctuation is less than this value, rectifiers are not turned on or off for Energy Optimization.
  - **Cycle Period:** This is the time period that rectifiers are turned on and off to maintain an equal operating time for all rectifiers in the system.
  - **All Rectifiers ON Time:** Time all rectifiers are turned on at the end of the "Cycle Period".
  - **Outgoing Alarms Blocked:**

    Normal: Alarms are processed normally.

    Blocked: Forces the alarm relays in the "off" state and blocks alarms from changing the relay state.
  - **Batt1 Rated Capacity:** Enter the battery string's rated capacity.
  - **SMDU1Batt2 Rated Capacity:** Enter the battery string's rated capacity.

System Tab Programmable Parameter Descriptions

Power System

- **Relay Output 1 (2, 3, 4, 5, 6, 7, 8, 14, 15, 16, 17):** Temporarily sets the relay active or not active when the controller is in Manual mode. Setting reverts to original when controller is returned to the Auto mode.

  Note: *Relays 9-13 can also be found in the EIB Equipment section, if equipped. (See page 106.)*

- **Clear Maintenance Run Time:** In manual mode, the only selection for "Clear Maintenance Run Time" is Yes. Once Yes is selected and confirmed, the Power System's Maintenance Run Time log is cleared.
- **Under Voltage 1:** Sets the Under Voltage 1 alarm point.
- **Under Voltage 2:** Sets the Under Voltage 2 alarm point.
- **Over Voltage 1:** Sets the Over Voltage 1 alarm point.
- **Over Voltage 2:** Sets the Over Voltage 2 alarm point.
- **System Current Alarm:** Sets the System Current alarm point.
- **High Load Level1**: Sets the High Load Level 1 alarm point (alarm point for total rectifier load).
- **High Load Level2:** Sets the High Load Level 2 alarm point (alarm point for total rectifier load).
- **Relay Test:** Sets the Relay Test feature to Automatic, Manual, or Disabled. Refer to “Using the Relay Test Feature” on page 25.
- **Relay Test Time:** Sets the Relay Test Time for the Automatic Relay Test feature.
- **Ambient Temp Sensor:** Sets the temperature sensor which displays the ambient temperature on the Web Interface's Homepage. Note that this temperature sensor MUST be set as an ambient temperature sensor. Select "None", or the temperature probe (System Temp1, System Temp2, System Temp3, IB2 Temp1, IB2 Temp2, EIB Temp1, EIB Temp2, SMTemp1 Temp1, ..., SMTemp1 Temp8, SMTemp8 Temp1, ..., SMTemp8 Temp8). You can also select Maximum or Average which takes the maximum or average reading of the temperature probes (any of System Temp1, System Temp2, System Temp3, IB2 Temp1, IB2 Temp2, EIB Temp1, EIB Temp2, SMTemp1 Temp1, ..., SMTemp1 Temp8, SMTemp8 Temp1, ..., SMTemp8 Temp8) set as ambient temperature probes.
- **Ambient Temp High2:** Sets the Ambient Temperature High 2 alarm point.
- **Ambient Temp High1:** Sets the Ambient Temperature High 1 alarm point.
- **Ambient Temp Low:** Sets the Ambient Temperature Low alarm point.
- **Fail Safe Mode:** When enabled, sets the relay designated as the "Critical Summary" alarm relay to operate in the "fail safe" mode. In this mode, the relay is energized during normal operation and de-energized for an alarm condition.
- **Rectifier Expansion:**
  - **Inactive:** Select this option if this is the only NCU controller in the power system.
  - **Primary:** Select this option if the power system consists of multiple bays with multiple NCU controllers and this controller is to be the primary controller. Note that only one (1) NCU controller can be set as the primary controller.

    Note: *When primary is selected, the NCU will start auto configure. This process will take more than three (3) minutes.*

  - **Secondary:** Select this option if the power system consists of multiple bays with multiple NCU controllers and this controller is to be a secondary controller.

    WARNING! DO NOT set the controller to Secondary from the Web Interface. You will not be able to log into the controller after it automatically reboots into secondary mode. Controllers to be designated as secondary controllers need to be set locally via the local keypad and display.

Primary/Secondary Procedure:

Up to four (4) NCU controllers can be connected together when a power system requires a greater number of rectifiers than can be controlled by a single NCU controller. One (1) controller is designated as the primary controller, the others as secondary controllers. The rectifiers controlled by the secondary controllers are designated as Rectifier Group 2 through 4 in the menus.

Note: *Changing the Rectifier Expansion setting may take more than 3 minutes for the NCU to configure the feature.*

1. Connect the NCU controllers in the multiple bays via the RS485 interface.
2. Set one of the NCU controllers as the primary controller.
3. Set all other NCU controllers as secondary controllers.

WARNING! DO NOT set the controller to Secondary from the Web Interface. You will not be able to log into the controller after it automatically reboots into secondary mode. Controllers to be designated as secondary controllers need to be set locally via the local keypad and display.

4. Set the address of the NCU controllers set as secondary controllers to 201, 202, or 203. Note that each secondary controller must be set to a different address.

- **PowerSplit Mode:** Enables or disables the power split feature ("master controlled" indicates the NCU system operates normally and "slave" indicates the NCU system is a slave system of the existing legacy system). See “Power Split Feature” on page 6 and “Power Split Feature” on page 28.
- **Slave Current Limit Value:** Current limit point for power system designated as the slave system in a "Power Split" configuration.
- **Delta Voltage:** The offset voltage that the power system designated as the slave system in a "Power Split" configuration is set to. It is suggested to leave this value at the default (0.5 volts).
- **Outgoing Alarms Blocked:**
  - **Normal:** Alarms are processed normally.
  - **Blocked:** Forces the alarm relays in the "off" state and blocks alarms from changing the relay state.
- **EStop / EShutdown**
  - **Disabled:** Disables the Emergency Stop and Emergency Shutdown functions.
  - **EStop:** Enables the Emergency Stop function.
  - **EShutdown:** Enables the Emergency Shutdown function.
- **Auto/Manual State:**
  - **Auto:** The controller automatically controls the power system.
  - **Manual:** A User can manually change certain power system control settings. When you return to Auto Mode, any settings changed in Manual Mode are returned to their previous setting (setting before being placed in Manual Mode). This provides a convenient means of making temporary adjustment changes for testing purposes.
- **Manual Mode Time Limit:** Time delay before returning to automatic control after being set for manual control. A "0" setting disables the "Manual Mode Time Limit" feature and the controller MUST be manually set to Auto control after being set to Manual control.
- **Maintenance Cycle Time:** The maintenance cycle time is the number of days before a Maintenance Alarm is issued. To reset the maintenance timer and clear the Maintenance Alarm, clear the Maintenance Run Time (Clear Maintenance Run Time menu item).
- **Solar Mode:** Sets solar mode as disabled, rect-solar, or solar mode.

- **DI1 Alarm State through DI12 Alarm State:** Sets the alarm state for the digital input (high or low).

AC Equipment

Rectifier AC

- **Nominal AC Voltage:** Enter the nominal line to neutral voltage (single feed rectifier) or nominal line to line voltage (three phase rectifier).
- **Mains Failure Alarm Limit 1:** Sets the Mains Failure Alarm 1 value (percent of nominal).
- **Mains Failure Alarm Limit 2:** Sets the Mains Failure Alarm 2 value (percent of nominal).

  Corresponding Alarms:

  - Phase A Voltage Low 1 (Nominal Minus "Mains Failure Alarm 1" Percent of Nominal)
  - Phase A Voltage Low 2 (Nominal Minus " Mains Failure Alarm 2" Percent of Nominal)
  - Phase A Voltage High 1 (Nominal Plus " Mains Failure Alarm 1" Percent of Nominal)
  - Phase A Voltage High 2 (Nominal Plus "V Mains Failure Alarm 2" Percent of Nominal)

  Phase A used in the example above, Phase B and Phase C are similar.

DC Equipment

DC

- **Shunt Current:** Enter the load shunt's current rating.
- **Shunt Voltage:** Enter the load shunt's voltage rating.
- **Load Shunt Exist:** Selects whether a load shunt exists or not.

LVD Group

Note: *This feature requires a BTRM sensor. The BTRM sensor is the sensor which is used for the High Temperature Disconnect (HTD) Feature.*

- **HTD Reconnect Point:** Sets temperature at which a reconnect will occur following a high temperature disconnect.
- **HTD Point:** Sets high temperature limit at which LVD1 and/or LVD2 contactors will open (disconnect) if the HTD1 and/or HTD2 features are enabled. If this temperature is reached, a disconnect occurs regardless of voltage.

EIB Equipment

EIB 1

- **Relay Output 9 (10, 11, 12, 13):** Temporarily sets the relay active or not active when the controller is in Manual mode. Setting reverts to original when controller is returned to the Auto mode.
- **Shunt # Set As (Not Used, General, Load, Battery):**
  - **Not Used:** Indicates this shunt input is not used.
  - **General:** Indicates the measurement of the shunt will be displayed and will not be added to Total DC Load or Total Battery Load.
  - **Load:** Indicates the measurement of the shunt will be displayed and added to the Total DC Load.
  - **Battery:** Indicates the measurement of the shunt will be displayed and added to the Total Battery Load and used with Battery Management.
- **Shunt # Full Current:** Enter the shunt's current rating.
- **Shunt # Full Voltage:** Enter the shunt's voltage rating.

- **Voltage Type:** The EIB assembly provides a total of eight (8) DC voltage inputs for battery block monitoring.
  - **24 (Block 2):** Selects the EIB to monitor up to four (4) 24V battery strings with two (2) 12V blocks per string.
  - **48 (Block 4):** Selects the EIB to monitor up to two (2) 48V battery strings with four (4) 12V blocks per string.
  - **Mid Point:** Selects the EIB to monitor the midpoint voltage of up to eight (8) battery strings for either 24V or 48V systems.
  - **Disabled:** Disables the battery block monitoring feature.
- **Block In-Use Num:** Number of 12V battery blocks being used.
- **Block Voltage Diff (12V):** This menu item appears if "24 (Block 2)" or "48 (Block 4)" is selected above. The "Block Voltage Diff (12V)" setting selects the alarm threshold for battery block monitoring. The NCU issues an alarm when any block voltage of any battery string has an abnormal value. The alarm is issued when the difference between any block voltage and a reference voltage is greater than the value of the block voltage difference setting.
- **Block Voltage Diff (Mid):** This menu item appears if "Mid Point" is selected above. The "Block Voltage Diff (Mid)" setting selects the alarm threshold for battery midpoint monitoring. The NCU issues an alarm when any battery midpoint voltage of any battery string has an abnormal value. The alarm is issued when the difference between any battery midpoint voltage and a reference voltage is greater than the value of the block voltage difference setting.

OBLVD Equipment

LVD Unit

- **LVD 1 Control:** Temporarily connects or disconnects LVD 1 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **LVD 2 Control:** Temporarily connects or disconnects LVD 2 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **LVD 1:** Enables or disables LVD 1.
- **LVD 1 Mode:** Sets LVD 1 to disconnect on a voltage or time setpoint.
- **LVD 1 Disconnect Voltage:** LVD 1 low voltage disconnect setting (when LVD set for voltage)
- **LVD 1 Reconnect Voltage:** LVD 1 reconnect setting (when LVD set for voltage).
- **LVD 1 Reconnect Delay:** Delay time period until LVD 1 reconnects once voltage recovers (when LVD set for voltage).
- **LVD 1 Time:** The time period before LVD 1 disconnection once an AC fail condition occurs (when LVD set for time).
- **LVD 1 Dependency:** Select if LVD 1 can disconnect only if LVD2 has disconnected, or none.
- **LVD 2:** Enables or disables LVD 2.
- **LVD 2 Mode:** Sets LVD 2 to disconnect on a voltage or time setpoint.
- **LVD 2 Disconnect Voltage:** LVD 2 low voltage disconnect setting (when LVD set for voltage)
- **LVD 2 Reconnect Voltage:** LVD 2 reconnect setting (when LVD set for voltage).
- **LVD 2 Reconnect Delay:** Delay time period until LVD 2 reconnects once voltage recovers (when LVD set for voltage).
- **LVD 2 Time:** The time period before LVD 2 disconnection once an AC fail condition occurs (when LVD set for time).
- **LVD 2 Dependency:** Select if LVD 2 can disconnect only if LVD 1 has disconnected, or none.
- **LVD 1 High Temp Disconnect:** Enables or disables the High Temperature 1 Disconnect feature. This feature causes LVD 1 contactors to open (disconnect) if a high temperature event occurs. (See "LVD Group" under the "System Tab Programmable Parameter Descriptions" on page 104.)

- **LVD 2 High Temp Disconnect:** Enables or disables the High Temperature 2 Disconnect feature. This feature causes LVD 2 contactors to open (disconnect) if a high temperature event occurs. (See "LVD Group" under the "System Tab Programmable Parameter Descriptions" on page 104.)
- **LVD Contactor Type:** Select the type of LVD Contactor. This setting should not be changed.

OBBattFuse Equipment

Battery Fuse Unit

- **Number of Battery Fuses:** Designates the number of battery fuses in the system.

SMDU Equipment

SMDU 1

- **Shunt # Set As (Not Used, General, Load, Battery):**
  - **Not Used:** Indicates this shunt input is not used.
  - **General:** Indicates the measurement of the shunt will be displayed and will not be added to Total DC Load or Total Battery Load.
  - **Load:** Indicates the measurement of the shunt will be displayed and added to the Total DC Load.
  - **Battery:** Indicates the measurement of the shunt will be displayed and added to the Total Battery Load and used with Battery Management.
- **Shunt # Current:** Enter the shunt's current rating.
- **Shunt # Voltage:** Enter the shunt's voltage rating.
- **Current # Break Value:** Set the value of the circuit breaker size.
- **Current # High Current Limit:** Set the High Current Limit alarm point.
- **Current # Very High Current Limit:** Set the Very High Current Limit alarm point.

SMDUP Equipment

SMDUP 1

- **Shunt # Current:** Enter the shunt's current rating.
- **Shunt # Voltage:** Enter the shunt's voltage rating.
- **Current # Break Value:** Set the value of the circuit breaker size.
- **Current # High Current Limit:** Set the High Current Limit alarm point.
- **Current # Very High Current Limit:** Set the Very High Current Limit alarm point.

SMDUP 2

- **Shunt # Current:** Enter the shunt's current rating.
- **Shunt # Voltage:** Enter the shunt's voltage rating.
- **Current # Break Value:** Set the value of the circuit breaker size.
- **Current # High Current Limit:** Set the High Current Limit alarm point.
- **Current # Very High Current Limit:** Set the Very High Current Limit alarm point.

SM Temp Group

- **Clear SM Temp Lost Alarm:** Clears an SM Temp lost alarm. The only selection is Clear. Once Clear is selected and confirmed, the alarm clears.

SMTemp Environment

SM Temp 1

- **Clear Probe Alarm:** Clears an SM Temp Probe Fail alarm. The only selection is Clear. Once Clear is selected and confirmed, the alarm clears.
- **SMTemp# Temp #:** Sets temperature port # on the SM-Temp # module to None, Battery, or Ambient.

SMDU-LVD Environment

SMDU 1 LVD

- **LVD 1 Control:** Temporarily connects or disconnects LVD 1 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **LVD 2 Control:** Temporarily connects or disconnects LVD 2 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **LVD 1:** Enables or disables LVD 1.
- **LVD 1 Mode:** Sets LVD 1 to disconnect on a voltage or time setpoint.
- **LVD 1 Disconnect Voltage:** LVD 1 low voltage disconnect setting (when LVD set for voltage)
- **LVD 1 Reconnect Voltage:** LVD 1 reconnect setting (when LVD set for voltage).
- **LVD 1 Reconnect Delay:** Delay time period until LVD 1 reconnects once voltage recovers (when LVD set for voltage).
- **LVD 1 Time:** The time period before LVD 1 disconnection once an AC fail condition occurs (when LVD set for time).
- **LVD 1 Dependency:** Select if LVD 1 can disconnect only if LVD2 has disconnected, or none.
- **LVD 2:** Enables or disables LVD 2.
- **LVD 2 Mode:** Sets LVD 2 to disconnect on a voltage or time setpoint.
- **LVD 2 Disconnect Voltage:** LVD 2 low voltage disconnect setting (when LVD set for voltage)
- **LVD 2 Reconnect Voltage:** LVD 2 reconnect setting (when LVD set for voltage).
- **LVD 2 Reconnect Delay:** Delay time period until LVD 2 reconnects once voltage recovers (when LVD set for voltage).
- **LVD 2 Time:** The time period before LVD 2 disconnection once an AC fail condition occurs (when LVD set for time).
- **LVD 2 Dependency:** Select if LVD 2 can disconnect only if LVD 1 has disconnected, or none.
- **LVD 1 High Temp Disconnect:** Enables or disables the High Temperature 1 Disconnect feature. This feature causes LVD 1 contactors to open (disconnect) if a high temperature event occurs. (See "LVD Group" under the “System Tab Programmable Parameter Descriptions” on page 104.)
- **LVD 2 High Temp Disconnect:** Enables or disables the High Temperature 2 Disconnect feature. This feature causes LVD 2 contactors to open (disconnect) if a high temperature event occurs. (See "LVD Group" under the “System Tab Programmable Parameter Descriptions” on page 104.)

Battery Tab Programmable Parameter Descriptions

- **Equalize/Float Charge Control:** Places the system in Equalize Charge or Float Charge mode.
- **Float Charge Voltage:** Float Charge output voltage setting.

- **Equalize Charge Voltage:** Equalize Charge output voltage setting.
- **Number of Battery Shunts:** Sets the number of battery shunts in the system.
- **Batt1 Rated Capacity:** Enter the battery string's rated capacity.
- **Batt2 Rated Capacity:** Enter the battery string's rated capacity.
- **Reset Battery Capacity:** Resets the battery capacity calculation. The only selection is Yes. Once Yes is selected and confirmed, the battery capacity calculation is reset.
- **Batt1 Shunt Current:** Enter the battery string shunt's current rating.
- **Batt1 Shunt Voltage:** Enter the battery string shunt's voltage rating.
- **Batt2 Shunt Current:** Enter the battery string shunt's current rating.
- **Batt2 Shunt Voltage:** Enter the battery string shunt's voltage rating.
- **Calculate Battery Current:** Selects whether or not the NCU calculates the battery current in the case of no battery shunt (load shunt required).
- **Temp Compensation Probe:** Select "None" for no temperature compensation, or the temperature probe (System Temp1, System Temp2, System Temp3, IB2 Temp1, IB2 Temp2, EIB Temp1, EIB Temp2, SMTemp1 Temp1, ..., SMTemp1 Temp8, SMTemp8 Temp1, ..., SMTemp8 Temp8) sensing battery temperature for temperature compensation. You can also select Maximum or Average which takes the maximum or average reading of the temperature probes (any of System Temp1, System Temp2, System Temp3, IB2 Temp1, IB2 Temp2, EIB Temp1, EIB Temp2, SMTemp1 Temp1, ..., SMTemp1 Temp8, SMTemp8 Temp1, ..., SMTemp8 Temp8) set as battery temperature probes. When used with an SM-BRC, you can select to average the SM-BRC temperature probe readings (Average SMBRC setting).
- **Comp Temp High 2:** Sets the Compensation Temperature High 2 alarm point.
- **Comp Temp High 1:** Sets the Compensation Temperature High 1 alarm point.
- **Comp Temp Low:** Sets the Compensation Temperature Low alarm point.
- **Temperature Compensation Center:** Sets the temperature at which the system operates at normal voltage levels.
- **Temp Comp Coefficient (slope):** Sets the temperature compensation slope or rate of change per °C above or below the "Temperature Compensation Center" setting. This value is expressed in millivolt per °C per string (mV/°C/str). For example, for a rate of change of 72 mV/°C/str in a 24-cell 48V nominal battery string, the rate of change is 3 mV per cell.
- **Temp Comp Voltage Clamp:** Enables or disables the temperature compensation voltage clamp feature.
- **Temp Comp Max Voltage:** Upper voltage limit where battery temperature compensation clamps the voltage.
- **Temp Comp Min Voltage:** Lower voltage limit where battery temperature compensation clamps the voltage.
- **BTRM Temp Sensor:** Sets the BTRM (Battery Thermal Runaway Management) temperature sensor. Note that this temperature sensor MUST be set as a battery temperature sensor. Select "None", or the temperature probe (System Temp1, System Temp2, System Temp3, IB2 Temp1, IB2 Temp2, EIB Temp1, EIB Temp2, SMTemp1 Temp1, ..., SMTemp1 Temp8, SMTemp8 Temp1, ..., SMTemp8 Temp8). You can also select Maximum or Average which takes the maximum or average reading of the temperature probes (any of System Temp1, System Temp2, System Temp3, IB2 Temp1, IB2 Temp2, EIB Temp1, EIB Temp2, SMTemp1 Temp1, ..., SMTemp1 Temp8, SMTemp8 Temp1, ..., SMTemp8 Temp8) set as battery temperature probes. When used with an SM-BRC, you can select to average the SM-BRC temperature probe readings.

  Note: *The BTRM sensor is the sensor which is used for the High Temperature Disconnect (HTD) Feature.*
- **BTRM Temp High 2:** Sets the BTRM Temperature High 2 alarm point. If battery temperature exceeds this setting, system voltage is lowered to the "BTRM Voltage" setting (if "BTRM Action" is set to "Lower Voltage").
- **BTRM Temp High 1:** Sets the BTRM Temperature High 1 alarm point.

- **BTRM Action:**
  - **Disabled:** Disables the Battery Thermal Runaway Management feature.
  - **Lower Voltage:** Sets the Battery Thermal Runaway Management feature to reducing the output voltage when battery temperature exceeds the BTRM Temperature High 2 alarm point.
- **BTRM Voltage:** Voltage that the system is set to when battery temperature exceeds the "BTRM Temperature High2" alarm point.
- **Low Capacity Point:** Battery low capacity alarm set point.
- **Curr Limited Mode:** Selects the current limit mode (disabled, current, or voltage).
- **Battery Current Limit:** Maximum battery charging current setting. For example, a value of 0.150C10 means that the charging current is limited to 15% of the battery's nominal capacity.
- **Over Current Limit:** Battery over current alarm setting. For example, a value of 0.300C10 means that when the charging current reaches 30% of the battery's nominal capacity, an alarm will be extended.
- **Automatic Equalize:** Enables or disables the Automatic Equalize Charge feature. When enabled, the following parameters can be set.
  - **Equalize Start Current:** The system is transferred to Equalize Charge mode when battery charge current increases to this setting. For example, a value of 0.060C10 means that an Automatic Equalize is started if the battery charge current is greater than 6% of the battery's nominal capacity.
  - **Equalize Start Capacity:** The system is transferred to Equalize Charge mode when remaining battery capacity decreases to this setting.
  - **Equalize Stop Current:** When in Equalize Charge mode and the battery charge current decreases below this setting for the "Equalize Charge Stop Delay Time" time period, the system is transferred to Float Charge mode. For example, a value of 0.010C10 means that when the charging current is less than 1% of the battery's nominal capacity, the system returns to the Float mode.
  - **Equalize Stop Delay Time:** See "Equalize Stop Current" above.

  Note: *If the power system has been automatically placed in Equalize mode, disabling Automatic Equalize will **not** return the system to Float mode until the current Equalize cycle is completed. To return immediately to Float mode, select Float Charge for the Equalize/Float Charge Control setting.*
- **Maximum Equalize Charge Time:** This is the maximum duration, in minutes, that an automatic equalize charge will last regardless of the other settings.
- **Cyclic Equalize :** Enables or disables cyclic (scheduled) equalize charging. When enabled, the following parameters can be set.
  - **Cyclic Equalize Interval:** Cyclic (scheduled) equalize charging interval.
  - **Cyclic Equalize Duration:** Cyclic (scheduled) equalize charging duration.
- **Charging Efficiency:** Value used to calculate remaining capacity of the battery.
- **Time 0.1C10:** Discharge time with a discharge current of 0.1C10.
- **Time 0.2C10:** Discharge time with a discharge current of 0.2C10.
- **Time 0.3C10:** Discharge time with a discharge current of 0.3C10.
- **Time 0.4C10:** Discharge time with a discharge current of 0.4C10.
- **Time 0.5C10:** Discharge time with a discharge current of 0.5C10.
- **Time 0.6C10:** Discharge time with a discharge current of 0.6C10.

- **Time 0.7C10:** Discharge time with a discharge current of 0.7C10.
- **Time 0.8C10:** Discharge time with a discharge current of 0.8C10.
- **Time 0.9C10:** Discharge time with a discharge current of 0.9C10.
- **Time 1.0C10:** Discharge time with a discharge current of 1.0C10.
- **Clear Abnormal Bat Current Alarm:** Clears an abnormal battery current alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.

ECO Tab Programmable Parameter Descriptions

- **ECO Mode:** Enables or disables the Energy Optimization Mode feature for all rectifiers. When enabled, the following parameters can be set.
  - **Best Operating Point:** Percent of full load capacity that the rectifiers operate under in the Energy Optimization mode.
  - **Load Fluctuation Range:** If load fluctuation is less than this value, rectifiers are not turned on or off for Energy Optimization.
  - **System Energy Saving Point:** Energy Optimization is disabled if the load is greater than this setting.
  - **Cycle Period:** This is the time period that rectifiers are turned on and off to maintain an equal operating time for all rectifiers in the system.
  - **All Rectifiers ON Time:** Time all rectifiers are turned on at the end of the "Cycle Period".
  - **Turn Off Delay:** When the Energy Optimization feature determines a rectifier can be switched off, this is the time delay before the rectifier is turned off.
- **Reset Cycle Alarm:** Resets the ECO Cycle Alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm resets.

LVD Tab Programmable Parameter Descriptions

LVD Unit

- **LVD 1:** Enables or disables LVD 1.
- **LVD 1 Mode:** Sets LVD 1 to disconnect on a voltage or time setpoint.
- **LVD 1 Disconnect Voltage:** LVD 1 low voltage disconnect setting (when LVD set for voltage)
- **LVD 1 Reconnect Voltage:** LVD 1 reconnect setting (when LVD set for voltage).
- **LVD 1 Reconnect Delay:** Delay time period until LVD 1 reconnects once voltage recovers (when LVD set for voltage).
- **LVD 1 Time:** The time period before LVD 1 disconnection once an AC fail condition occurs (when LVD set for time).
- **LVD 1 Dependency:** Select if LVD 1 can disconnect only if LVD2 has disconnected, or none.
- **LVD 1 High Temp Disconnect:** Enables or disables the High Temperature 1 Disconnect feature. This feature causes LVD 1 contactors to open (disconnect) if a high temperature event occurs. (See "LVD Group" under the "System Tab Programmable Parameter Descriptions" on page 104.)
- **LVD 2:** Enables or disables LVD 2.
- **LVD 2 Mode:** Sets LVD 2 to disconnect on a voltage or time setpoint.
- **LVD 2 Disconnect Voltage:** LVD 2 low voltage disconnect setting (when LVD set for voltage)
- **LVD 2 Reconnect Voltage:** LVD 2 reconnect setting (when LVD set for voltage).
- **LVD 2 Reconnect Delay:** Delay time period until LVD 2 reconnects once voltage recovers (when LVD set for voltage).
- **LVD 2 Time:** The time period before LVD 2 disconnection once an AC fail condition occurs (when LVD set for time).

- **LVD 2 Dependency:** Select if LVD 2 can disconnect only if LVD 1 has disconnected, or none.
- **LVD 2 High Temp Disconnect:** Enables or disables the High Temperature 2 Disconnect feature. This feature causes LVD 2 contactors to open (disconnect) if a high temperature event occurs. (See "LVD Group" under the "System Tab Programmable Parameter Descriptions" on page 104.)
- **LVD Contactor Type:** Select the type of LVD Contactor. This setting should not be changed.
- **LVD 1 Control:** Temporarily connects or disconnects LVD 1 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **LVD 2 Control:** Temporarily connects or disconnects LVD 2 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.

SMDU 1 LVD

- **LVD 1:** Enables or disables LVD 1.
- **LVD 1 Mode:** Sets LVD 1 to disconnect on a voltage or time setpoint.
- **LVD 1 Disconnect Voltage:** LVD 1 low voltage disconnect setting (when LVD set for voltage)
- **LVD 1 Reconnect Voltage:** LVD 1 reconnect setting (when LVD set for voltage).
- **LVD 1 Reconnect Delay:** Delay time period until LVD 1 reconnects once voltage recovers (when LVD set for voltage).
- **LVD 1 Time:** The time period before LVD 1 disconnection once an AC fail condition occurs (when LVD set for time).
- **LVD 1 Dependency:** Select if LVD 1 can disconnect only if LVD2 has disconnected, or none.
- **LVD 1 High Temp Disconnect:** Enables or disables the High Temperature 1 Disconnect feature. This feature causes LVD 1 contactors to open (disconnect) if a high temperature event occurs. (See "LVD Group" under the "System Tab Programmable Parameter Descriptions" on page 104.)
- **LVD 2:** Enables or disables LVD 2.
- **LVD 2 Mode:** Sets LVD 2 to disconnect on a voltage or time setpoint.
- **LVD 2 Disconnect Voltage:** LVD 2 low voltage disconnect setting (when LVD set for voltage)
- **LVD 2 Reconnect Voltage:** LVD 2 reconnect setting (when LVD set for voltage).
- **LVD 2 Reconnect Delay:** Delay time period until LVD 2 reconnects once voltage recovers (when LVD set for voltage).
- **LVD 2 Time:** The time period before LVD 2 disconnection once an AC fail condition occurs (when LVD set for time).
- **LVD 2 Dependency:** Select if LVD 2 can disconnect only if LVD 1 has disconnected, or none.
- **LVD 2 High Temp Disconnect:** Enables or disables the High Temperature 2 Disconnect feature. This feature causes LVD 2 contactors to open (disconnect) if a high temperature event occurs. (See "LVD Group" under the "System Tab Programmable Parameter Descriptions" on page 104.)
- **LVD 1 Control:** Temporarily connects or disconnects LVD 1 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **LVD 2 Control:** Temporarily connects or disconnects LVD 2 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.

Temp Probes Tab Programmable Parameter Descriptions

- **IB2 Temp 1:** Sets temperature port 1 on the IB2 board to None, Battery, or Ambient.
- **IB2 Temp1 High 2:** Sets temperature port 1 on the IB2 board "Temperature High 2" alarm point.
- **IB2 Temp1 High 1:** Sets temperature port 1 on the IB2 board "Temperature High 1" alarm point.

- **IB2 Temp1 Low:** Sets temperature port 1 on the IB2 board "Temperature Low" alarm point.
- **IB2 Temp 2:** Sets temperature port 2 on the IB2 board to None, Battery, or Ambient.
- **IB2 Temp2 High 2:** Sets temperature port 2 on the IB2 board "Temperature High 2" alarm point.
- **IB2 Temp2 High 1:** Sets temperature port 2 on the IB2 board "Temperature High 1" alarm point.
- **IB2 Temp2 Low:** Sets temperature port 2 on the IB2 board "Temperature Low" alarm point.
- **EIB Temp 1:** Sets temperature port 1 on the EIB board to None, Battery, or Ambient.
- **EIB Temp1 High 2:** Sets temperature port 1 on the EIB board "Temperature High 2" alarm point.
- **EIB Temp1 High 1:** Sets temperature port 1 on the EIB board "Temperature High 1" alarm point.
- **EIB Temp1 Low:** Sets temperature port 1 on the EIB board "Temperature Low" alarm point.
- **EIB Temp 2:** Sets temperature port 2 on the EIB board to None, Battery, or Ambient.
- **EIB Temp2 High 2:** Sets temperature port 2 on the EIB board "Temperature High 2" alarm point.
- **EIB Temp2 High 1:** Sets temperature port 2 on the EIB board "Temperature High 1" alarm point.
- **EIB Temp2 Low:** Sets temperature port 2 on the EIB board "Temperature Low" alarm point.
- **SMTemp# Temp #:** Sets temperature port # on the SM-Temp # module to None, Battery, or Ambient.
- **SMTemp# Temp# High 2:** Sets temperature port # on the SM-Temp # module "Temperature High 2" alarm point.
- **SMTemp# Temp# High 1:** Sets temperature port # on the SM-Temp # module "Temperature High 1" alarm point.
- **SMTemp# Temp# Low:** Sets temperature port # on the SM-Temp # module "Temperature Low" alarm point.

Rectifiers Tab Programmable Parameter Descriptions

- **Current Limit:** Enables or disables adjusting the output current limit point.

  Note: *By default this is set to disabled. When disabled, rectifier current limit is set in the rectifier (not via the NCU) at the maximum current limit point.*

- **Current Limit Point:** Sets the output current limit point for all rectifiers combined when the "Current Limit" setting above is set to enabled.
- **HVSD:** Enables or disables the High Voltage Shutdown feature for all rectifiers.
- **HVSD Limit:** Sets the High Voltage Shutdown point for all rectifiers when the "HVSD" setting above is set to enabled.
- **Restart on HVSD:** Enables or disables the High Voltage Shutdown Restart feature for all rectifiers.
- **HVSD Restart Time:** When the High Voltage Shutdown Restart feature is enabled and the output exceeds the high voltage limit, the rectifiers restart after this time period expires.
- **Walk-In:** Enables or disables the start-up walk-in feature for all rectifiers.
- **Walk- In Time:** Sets the start-up walk-in time when the "Walk-In" setting above is set to enabled.
- **Sequence Start Interval:** Sets the sequence start interval (time period between starting each rectifier in the system).
- **Nominal AC Voltage:** Enter the nominal line to neutral voltage (signal phase rectifier) or nominal line to line voltage (three phase rectifier).
- **Mains Failure Alarm Limit 1:** Sets the Mains Failure Alarm 1 value (percent of nominal).
- **Mains Failure Alarm Limit 2:** Sets the Mains Failure Alarm 2 value (percent of nominal).

Corresponding Alarms:

- Phase A Voltage Low 1 (Nominal Minus "Mains Failure Alarm 1" Percent of Nominal)
- Phase A Voltage Low 2 (Nominal Minus " Mains Failure Alarm 2" Percent of Nominal)
- Phase A Voltage High 1 (Nominal Plus " Mains Failure Alarm 1" Percent of Nominal)
- Phase A Voltage High 2 (Nominal Plus "V Mains Failure Alarm 2" Percent of Nominal)

Phase A used in the example above, Phase B and Phase C are similar.

- **Turn On when AC Over Voltage:** Enables or disables the "Rectifier On at AC Overvoltage" feature. When the system is operating on "week" grid input power (i.e. diesel generator), the input voltage may have a very high peak voltage which may cause a rectifier not to turn on. If "Rectifier On at AC Overvoltage" feature is enabled, the rectifier is forced to turn on.
- **Input Current Limit:** Sets the Input Current Limit point for all rectifiers.
- **MixHE Power:** Allows the system to use rectifiers of different output capacity. When set to derated power, the output capacity of the higher capacity rectifiers are set to the capacity of the lowest.
- **Diesel Generator Power Limit:** Enables or disables the Diesel Generator Power Limit feature. This feature limits rectifier output power to a percentage of maximum when AC input is supplied by a diesel-alternator set.
- **Diesel Generator Digital Input:** Sets the digital input monitoring the grid.
- **Diesel Gen Power Limit Point Set:** Sets, as a percentage, the maximum output power at which rectifiers can operate when: 1. the Diesel Power Limit feature is enabled and 2. a digital input signal is received from the connected diesel-alternator set.
- **Rectifier Trim:** Temporarily sets the output voltage for all rectifiers when the controller is in Manual mode. Voltage can be increased or decreased from the existing Float Charge or Equalize Charge setting, depending which mode the controller was in when set to "Manual". Setting reverts to original when controller is returned to the Auto mode.
- **DC On/Off Control:** Temporarily turns the DC output on or off for all rectifiers when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **AC On/Off Control:** Temporarily turns the AC input on or off for all rectifiers when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Rectifiers LED Control:** Temporarily sets whether or not a rectifier's local power indicator blinks when the controller is communicating with the rectifier when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Fan Speed Control:** Sets the fan speed for all rectifiers.
- **Confirm Rectifier ID/Feed:** After changing rectifier ID and/or input feed assignments, use this menu item to confirm the change. The only selection is Yes. Once Yes is selected and confirmed, the ID and feed setting of all rectifiers are updated.
- **Reset Rectifier IDs:** Resets the rectifier IDs after they have been previously changed and confirmed. The only selection is Yes. Once Yes is selected and confirmed, the NCU resets the rectifier IDs by reassigning ID numbers.
- **Reset Cycle Alarm:** Resets a rectifier oscillator alarm. The only selection is Clear. Once Clear is selected and confirmed, the alarm clears.
- **Clear Rectifier Lost Alarm:** Clears a rectifier lost alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.
- **Clear Rectifier Comm Fail Alarm:** Clears a rectifier communication fail alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.

DC/DC Converters Tab Programmable Parameter Descriptions

- **Output Voltage:** Sets the output voltage for all converters.

- **Current Limit:** Enables or disables adjusting the output current limit point.
- **Current Limit Point:** Sets the output current limit point for all converters combined when the "Current Limit" setting above is set to enabled.
- **HVSD:** Enables or disables the High Voltage Shutdown feature for all converters.
- **HVSD Limit:** Sets the High Voltage Shutdown point for all converters when the "HVSD" setting above is set to enabled.
- **Under Voltage:** Sets the converter Under Voltage alarm point.
- **Over Voltage:** Sets the converter Over Voltage alarm point.
- **Over Current:** Sets the converter Over Current alarm point.
- **Converter Trim(24V):** Temporarily sets the output voltage for all converters when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Converter LEDs Control:** Temporarily sets whether or not a converter's local power indicator blinks when the controller is communicating with the converter when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Fan Speed Control:** Sets the fan speed for all converters.
- **Confirm Converter ID:** After changing converter ID assignments, use this menu item to confirm the change. The only selection is Yes. Once Yes is selected and confirmed, the ID setting of all converters is updated.
- **Reset Converter IDs:** Resets the converter IDs after they have been previously changed and confirmed. The only selection is Yes. Once Yes is selected and confirmed, the NCU resets the converter IDs by reassigning ID numbers.
- **Clear Converter Lost Alarm:** Clears a converter lost alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.
- **Clear All Converters Comm Fail:** Clears an "All Converter Comm Fail" alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.
- **Clear Converter Comm Fail:** Clears all "Converter Comm Fail" alarms. The only selection is Yes. Once Yes is selected and confirmed, the alarm(s) clears.

Solar Tab Programmable Parameter Descriptions

- **Clear Solar Converter Lost Alarm:** Clears a solar converter lost alarm. The only selection is Clear. Once Clear is selected and confirmed, the alarm clears.

Battery Test Tab Programmable Parameter Descriptions

- **Battery Test Control:** Starts or stops battery test.
- **AC Fail Test:** Enables or disables starting a battery discharge test during an AC input failure condition.
- **Constant Current Test:** Enables or disables a Constant Current Battery Discharge Test. During this test, the controller automatically adjusts the rectifiers' output voltage to maintain the battery discharge current at a preset value (Constant Current Test Current).
- **Constant Current Test Current:** Constant current setting for a Constant Current Battery Discharge Test.
- **Short Test:** Enables or disables a Short Battery Discharge Test. A Short Battery Discharge Test is a short duration battery discharge test used to verify that parallel batteries are discharging equally. If the discharge current difference between the two batteries exceeds a preset value, an alarm is generated.

  Note: *This test requires a system with two battery shunts.*

- **Short Test Cycle:** Short Battery Discharge Test interval (days).
- **Short Test Time:** Short Battery Discharge Test time (minutes).
- **Short Test Max Difference Current:** An alarm is generated if the maximum difference between discharge currents of the two batteries exceeds this limit.
- **Test Voltage Level:** System output voltage setting during a battery discharge test.
- **End Test Voltage:** This is the "end of test voltage level" for battery discharge tests. A battery discharge test will end if battery voltage decreases to this setting.
- **End Test Time:** This is the "end of test time period" for battery discharge tests. A battery discharge test will end if this time period is exceeded.
- **End Test Capacity:** This is the "end of test remaining battery capacity" for battery discharge tests. A battery discharge test will end if remaining battery capacity decreases to this setting. For example, a value of 0.700C10 means that when the discharging current reaches 70% of the battery's nominal capacity, the battery test is ended.
- **Record Threshold:** Every time the battery voltage is changed more than this threshold, a new line is stored in the battery test log.
- **Number of Planned Tests per Year:** Number of planned battery discharge test per year. There can be up to twelve (12) battery discharge tests per year. A "0" setting disables the planned test feature.
- **Planned Test # (MM-DD Hr):** Setting for when planned battery discharge test # occurs. Note that there can be up to twelve (12) battery discharge tests per year.
- **Clear Bad Battery Alarm:** Clears a bad battery alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.
- **Clear Battery Test Fail Alarm:** Clears a battery test fail alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.
- **Clear Discharge Curr Imbalance:** Clears a discharge current imbalance alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.

Time Settings Tab Programmable Parameter Descriptions

- **Specify Time**
  - **Get Local Time from Connected PC:** Allows you to automatically set the time. When selected, the controller will get the same time as the connected PC.
  - **Date & Time:** Allows you to manually set the date and time.
- **Local Zone (for synchronization with time servers):** When selected, the controller will get the local zone automatically or you can enter the zone.
- **Get time automatically from the following servers.**
  - When selected, the controller will get the time from the selected time server. The controller will also adjust the time per the "Local Zone" setting.

HISTORY LOG MENU

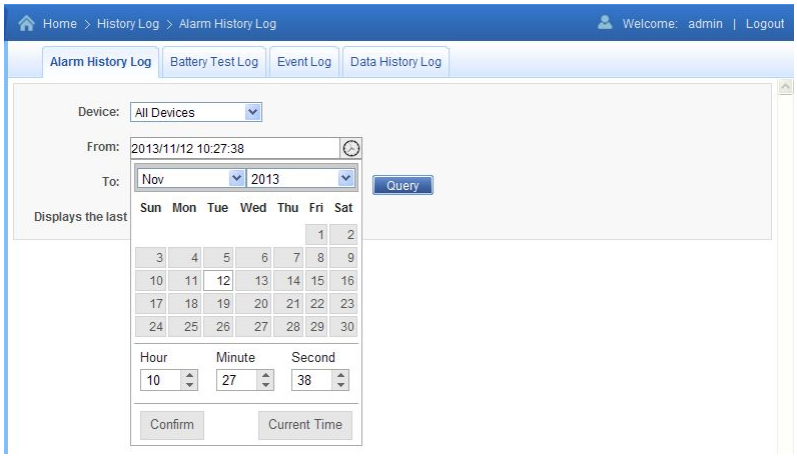
The History Log Menu allows you to view and save the various logs available in the NCU.

Alarm History Log Tab

Select Device and Time

Select the "Device" to query from the drop-down list box. Select the "from" and "to" time.

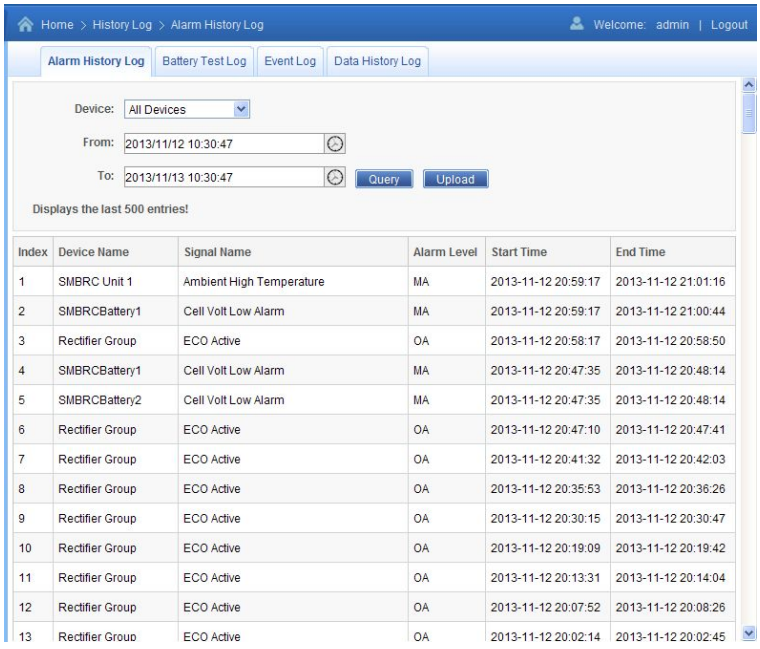
Figure 42. Alarm History Log Device and Time Selection



Query Alarm History Log

Click “Query” to query for alarms within selected time slot. The Web page displays the last 500 entries.

Figure 43. Alarm History Log Query



Index	Device Name	Signal Name	Alarm Level	Start Time	End Time
1	SMBRC Unit 1	Ambient High Temperature	MA	2013-11-12 20:59:17	2013-11-12 21:01:16
2	SMBRCBattery1	Cell Volt Low Alarm	MA	2013-11-12 20:59:17	2013-11-12 21:00:44
3	Rectifier Group	ECO Active	OA	2013-11-12 20:58:17	2013-11-12 20:58:50
4	SMBRCBattery1	Cell Volt Low Alarm	MA	2013-11-12 20:47:35	2013-11-12 20:48:14
5	SMBRCBattery2	Cell Volt Low Alarm	MA	2013-11-12 20:47:35	2013-11-12 20:48:14
6	Rectifier Group	ECO Active	OA	2013-11-12 20:47:10	2013-11-12 20:47:41
7	Rectifier Group	ECO Active	OA	2013-11-12 20:41:32	2013-11-12 20:42:03
8	Rectifier Group	ECO Active	OA	2013-11-12 20:35:53	2013-11-12 20:36:26
9	Rectifier Group	ECO Active	OA	2013-11-12 20:30:15	2013-11-12 20:30:47
10	Rectifier Group	ECO Active	OA	2013-11-12 20:19:09	2013-11-12 20:19:42
11	Rectifier Group	ECO Active	OA	2013-11-12 20:13:31	2013-11-12 20:14:04
12	Rectifier Group	ECO Active	OA	2013-11-12 20:07:52	2013-11-12 20:08:26
13	Rectifier Group	ECO Active	OA	2013-11-12 20:02:14	2013-11-12 20:02:45

Upload Alarm History Log

Click “Upload” to open the log into another window. You can then save the log as an .html (Web page) or .txt (text) file.

Figure 44. Alarm History Log Upload

Query Alarm History Log
Query EquipID: Rectifier #1
Query Time: from 2013-11-11 16:05:40 to 2013-11-12 16:05:40
Total 15 alarm(s) queried.

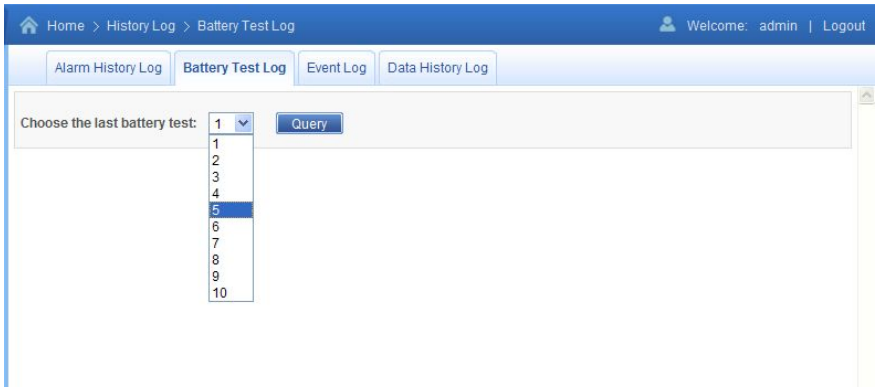
Index	Device Name	Signal Name	Alarm Level	Start Time	End Time
1	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:48:33	2013-11-12 00:50:25
2	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:45:32	2013-11-12 00:48:24
3	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:44:58	2013-11-12 00:45:18
4	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:44:09	2013-11-12 00:44:43
5	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:43:10	2013-11-12 00:43:18
6	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:15:52	2013-11-12 00:41:40
7	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:15:32	2013-11-12 00:15:38
8	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:14:47	2013-11-12 00:15:17
9	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:14:09	2013-11-12 00:14:13
10	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:13:44	2013-11-12 00:13:48
11	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:12:43	2013-11-12 00:13:18
12	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:12:14	2013-11-12 00:12:29
13	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:11:55	2013-11-12 00:12:04
14	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:11:25	2013-11-12 00:11:39
15	Rectifier #1	Rectifier Communication Fail	MA	2013-11-12 00:10:47	2013-11-12 00:11:11

Battery Test Log Tab

Select Battery Test Number

Select the Battery Test Log to query from the drop-down list box. Battery test #1 is the most recent.

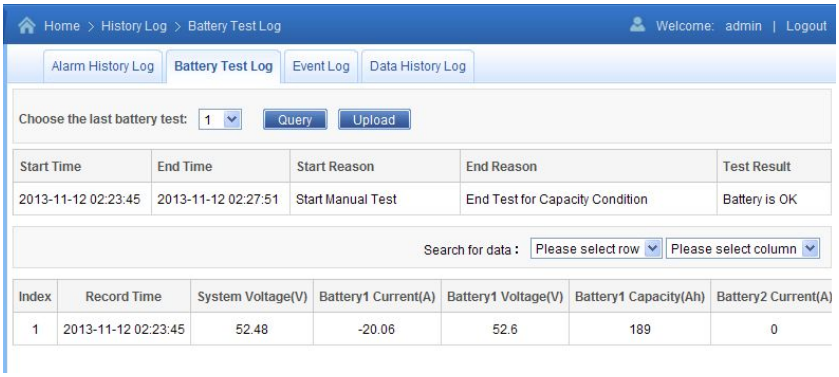
Figure 45. Battery Test Log Number Selection



Query Selected Battery Test

Click "Query" to query the selected battery test.

Figure 46. Battery Test Log Query



Upload Battery Test Log

Click "Upload" to open the log into another window. You can then save the log as an .html (Web page) or .txt (text) file.

Figure 47. Battery Test Log Upload

Query Battery Test Log
Start time: 2013-11-12 02:23:45
End time : 2013-11-12 02:27:51
Start reason : Start Manual Test
End reason : End Test for Capacity Condition
Test result : Battery is OK

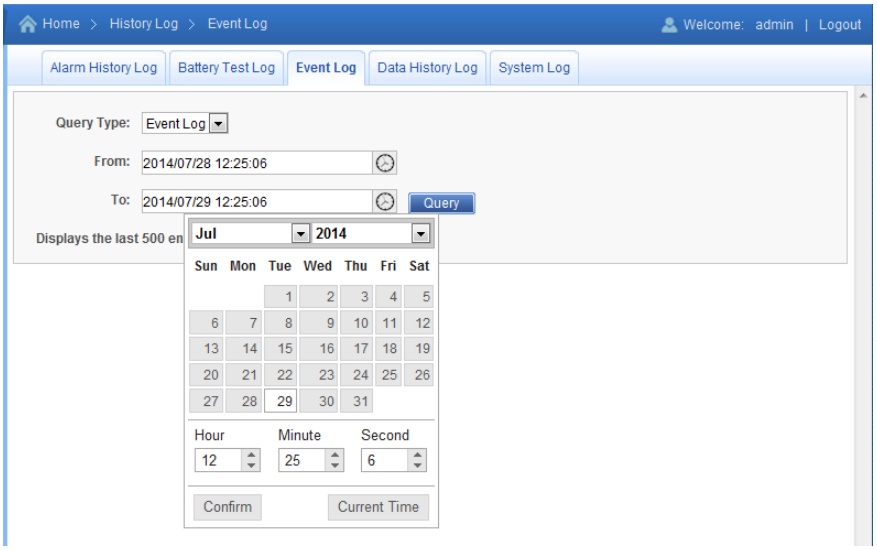
Index	Record Time	System Voltage(V)	Battery1 Current	Battery1 Voltage	Battery1 Capacity	Battery2 Current	Battery2 Voltage	Battery2 Capacity
1	2013-11-12 02:23:45	52.48	-20.06	52.60	189	0.00	0.00	300

Event Log Tab

Select Time

Select the "from" and "to" time.

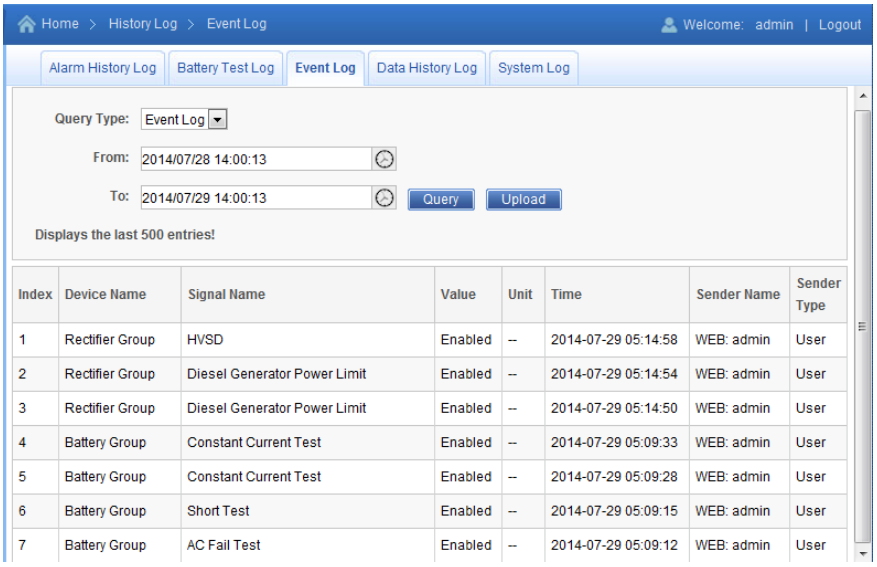
Figure 48. Event Log Time Selection



Query Event Log

Click “Query” to query the Event Log. The Web page displays the last 500 entries.

Figure 49. Event Log Query



Index	Device Name	Signal Name	Value	Unit	Time	Sender Name	Sender Type
1	Rectifier Group	HVSD	Enabled	--	2014-07-29 05:14:58	WEB: admin	User
2	Rectifier Group	Diesel Generator Power Limit	Enabled	--	2014-07-29 05:14:54	WEB: admin	User
3	Rectifier Group	Diesel Generator Power Limit	Enabled	--	2014-07-29 05:14:50	WEB: admin	User
4	Battery Group	Constant Current Test	Enabled	--	2014-07-29 05:09:33	WEB: admin	User
5	Battery Group	Constant Current Test	Enabled	--	2014-07-29 05:09:28	WEB: admin	User
6	Battery Group	Short Test	Enabled	--	2014-07-29 05:09:15	WEB: admin	User
7	Battery Group	AC Fail Test	Enabled	--	2014-07-29 05:09:12	WEB: admin	User

Upload Event Log

Click “Upload” to open the log into another window. You can then save the log as an .html (Web page) or .txt (text) file.

Figure 50. Event Log Upload

Query Event Log
Query Time: from 2014-07-28 14:00:13 to 2014-07-29 14:00:13
Total 7 record(s) queried.

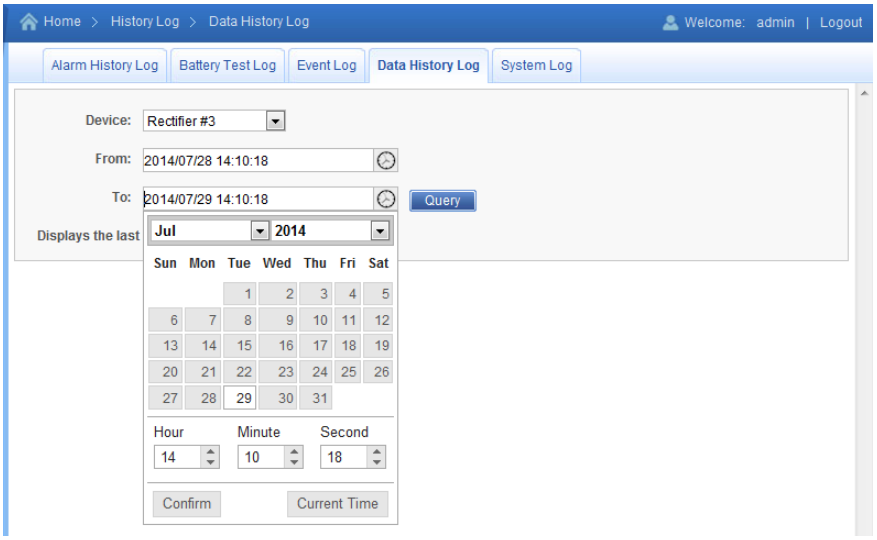
Index	Device Name	Signal Name	Value	Unit	Time	Sender Name	Sender Type
1	Rectifier Group	HVSD	Enabled	--	2014-07-29 05:14:58	WEB: admin	User
2	Rectifier Group	Diesel Generator Power Limit	Enabled	--	2014-07-29 05:14:54	WEB: admin	User
3	Rectifier Group	Diesel Generator Power Limit	Enabled	--	2014-07-29 05:14:50	WEB: admin	User
4	Battery Group	Constant Current Test	Enabled	--	2014-07-29 05:09:33	WEB: admin	User
5	Battery Group	Constant Current Test	Enabled	--	2014-07-29 05:09:28	WEB: admin	User
6	Battery Group	Short Test	Enabled	--	2014-07-29 05:09:15	WEB: admin	User
7	Battery Group	AC Fail Test	Enabled	--	2014-07-29 05:09:12	WEB: admin	User

Data History Log Tab

Select Device and Time

Select the "Device" to query from the drop-down list box. Select the "from" and "to" time.

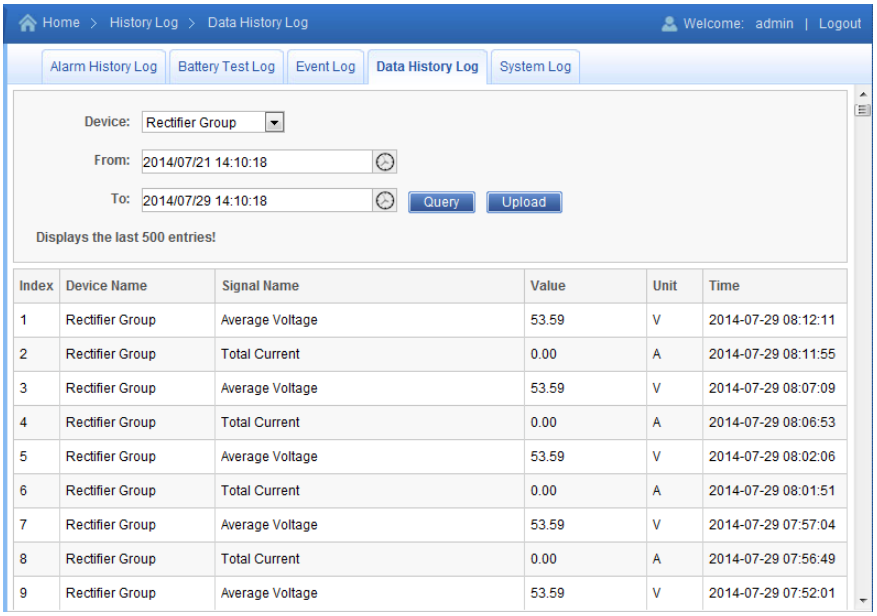
Figure 51. Data History Log Device and Time



Query Data History Log

Click “Query” to query for Date History within selected time slot. The Web page displays the last 500 entries.

Figure 52. Data History Log Query



Index	Device Name	Signal Name	Value	Unit	Time
1	Rectifier Group	Average Voltage	53.59	V	2014-07-29 08:12:11
2	Rectifier Group	Total Current	0.00	A	2014-07-29 08:11:55
3	Rectifier Group	Average Voltage	53.59	V	2014-07-29 08:07:09
4	Rectifier Group	Total Current	0.00	A	2014-07-29 08:06:53
5	Rectifier Group	Average Voltage	53.59	V	2014-07-29 08:02:06
6	Rectifier Group	Total Current	0.00	A	2014-07-29 08:01:51
7	Rectifier Group	Average Voltage	53.59	V	2014-07-29 07:57:04
8	Rectifier Group	Total Current	0.00	A	2014-07-29 07:56:49
9	Rectifier Group	Average Voltage	53.59	V	2014-07-29 07:52:01

Upload Data History Log

Click “Upload” to open the log into another window. You can then save the log as an .html (Web page) or .txt (text) file.

Figure 53. Data History Log Upload

Query Data History Log
Query EquipID: Rectifier Group
Query Time: from 2014-07-21 14:10:18 to 2014-07-29 14:10:18
Total 4726 record(s) queried.

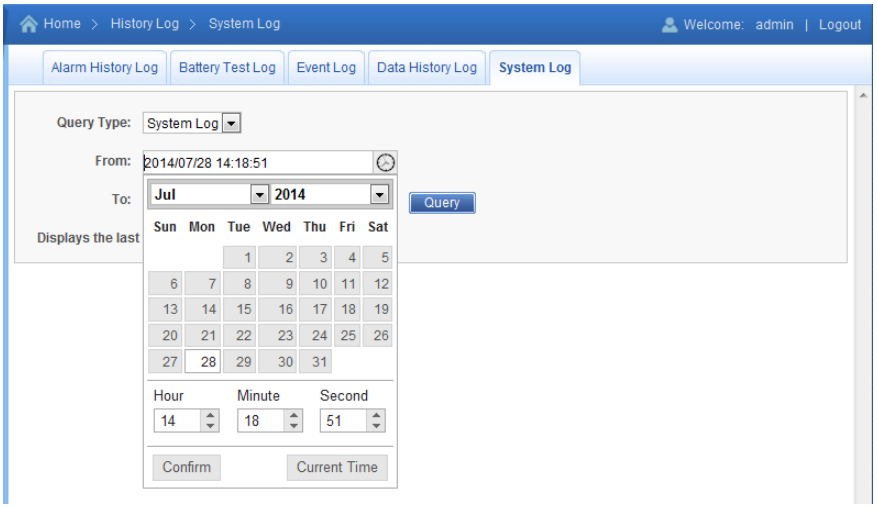
Index	Device Name	Signal Name	Value	Unit	Time
1	Rectifier Group	Average Voltage	53.59	V	2014-07-29 08:12:11
2	Rectifier Group	Total Current	0.00	A	2014-07-29 08:11:55
3	Rectifier Group	Average Voltage	53.59	V	2014-07-29 08:07:09
4	Rectifier Group	Total Current	0.00	A	2014-07-29 08:06:53
5	Rectifier Group	Average Voltage	53.59	V	2014-07-29 08:02:06
6	Rectifier Group	Total Current	0.00	A	2014-07-29 08:01:51
7	Rectifier Group	Average Voltage	53.59	V	2014-07-29 07:57:04
8	Rectifier Group	Total Current	0.00	A	2014-07-29 07:56:49
9	Rectifier Group	Average Voltage	53.59	V	2014-07-29 07:52:01
10	Rectifier Group	Total Current	0.00	A	2014-07-29 07:51:46
11	Rectifier Group	Average Voltage	53.59	V	2014-07-29 07:46:58
12	Rectifier Group	Total Current	0.00	A	2014-07-29 07:46:43
13	Rectifier Group	Average Voltage	53.59	V	2014-07-29 07:41:56

System Log Tab

Select Time

Select the "from" and "to" time.

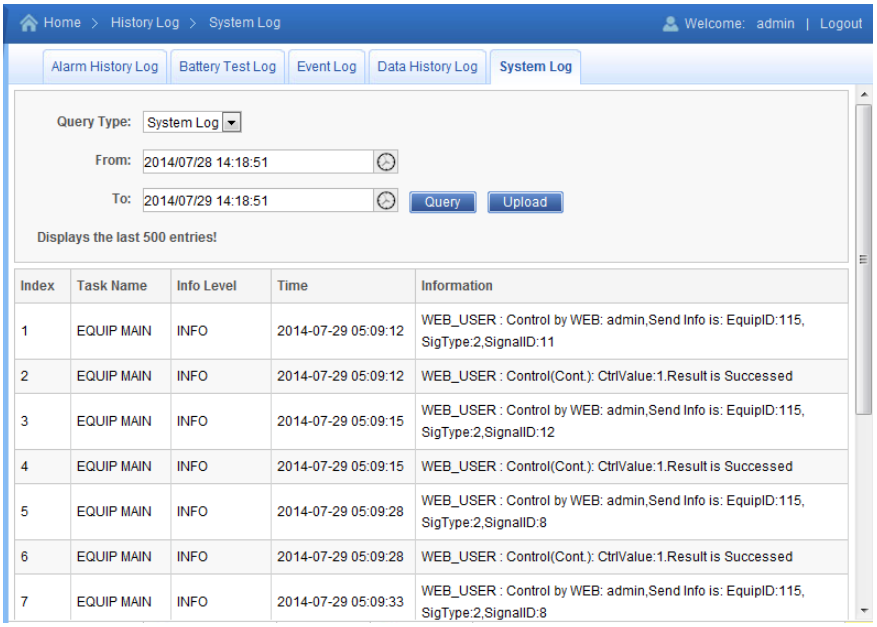
Figure 54. System Log Time Selection



Query System Log

Click “Query” to query the System Log. The Web page displays the last 500 entries.

Figure 55. System Log Query

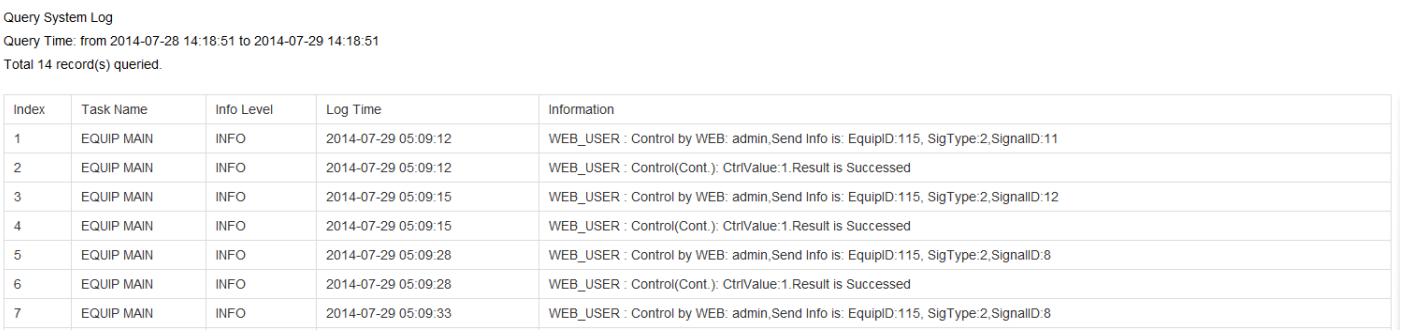


Index	Task Name	Info Level	Time	Information
1	EQUIP MAIN	INFO	2014-07-29 05:09:12	WEB_USER : Control by WEB: admin,Send Info is: EquipID:115, SigType:2,SignalID:11
2	EQUIP MAIN	INFO	2014-07-29 05:09:12	WEB_USER : Control(Cont.): CtrlValue:1.Result is Successed
3	EQUIP MAIN	INFO	2014-07-29 05:09:15	WEB_USER : Control by WEB: admin,Send Info is: EquipID:115, SigType:2,SignalID:12
4	EQUIP MAIN	INFO	2014-07-29 05:09:15	WEB_USER : Control(Cont.): CtrlValue:1.Result is Successed
5	EQUIP MAIN	INFO	2014-07-29 05:09:28	WEB_USER : Control by WEB: admin,Send Info is: EquipID:115, SigType:2,SignalID:8
6	EQUIP MAIN	INFO	2014-07-29 05:09:28	WEB_USER : Control(Cont.): CtrlValue:1.Result is Successed
7	EQUIP MAIN	INFO	2014-07-29 05:09:33	WEB_USER : Control by WEB: admin,Send Info is: EquipID:115, SigType:2,SignalID:8

Upload System Log

Click “Upload” to open the log into another window. You can then save the log as an .html (Web page) or .txt (text) file.

Figure 56. System Log Upload



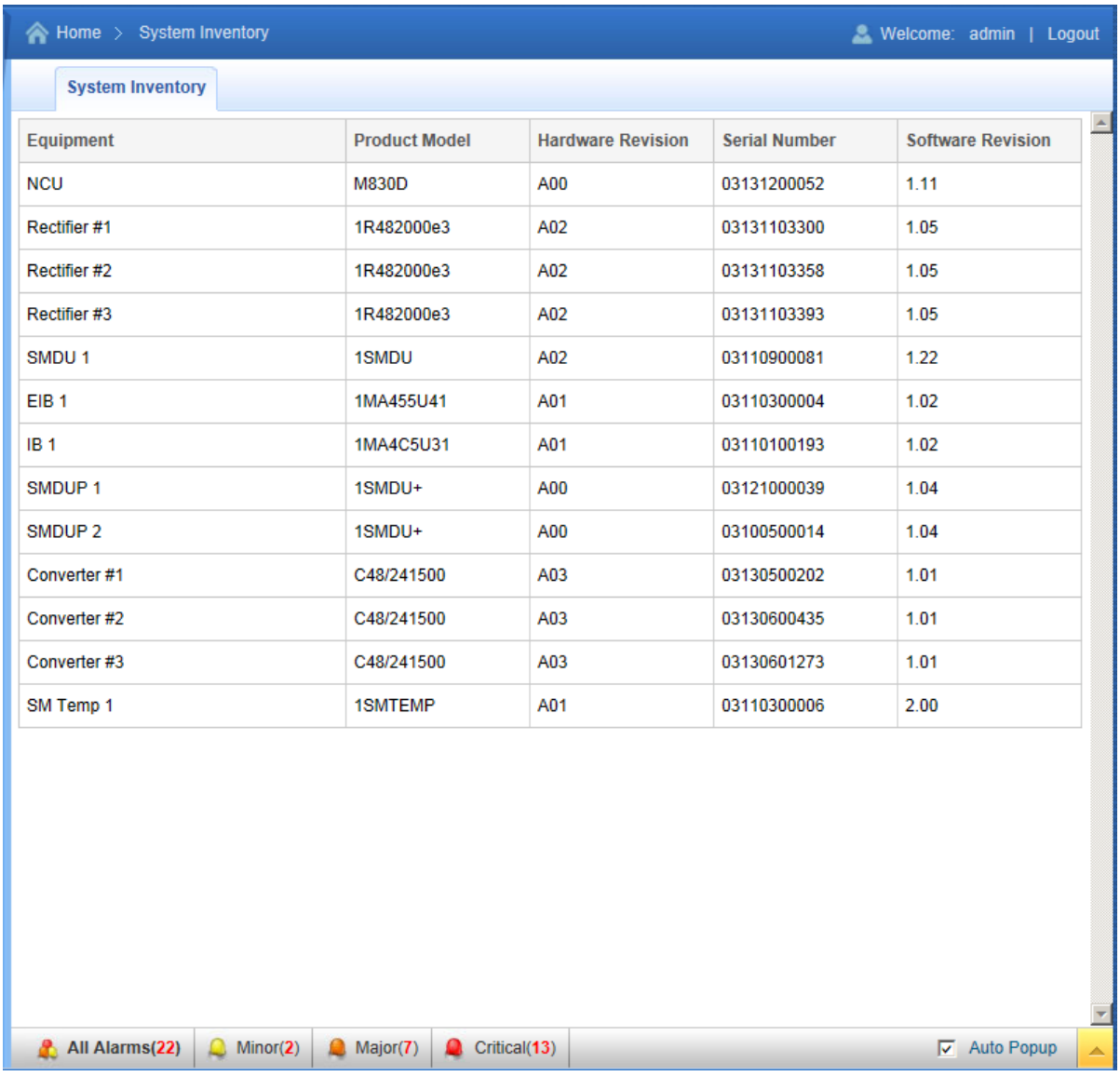
Query System Log
Query Time: from 2014-07-28 14:18:51 to 2014-07-29 14:18:51
Total 14 record(s) queried.

Index	Task Name	Info Level	Log Time	Information
1	EQUIP MAIN	INFO	2014-07-29 05:09:12	WEB_USER : Control by WEB: admin,Send Info is: EquipID:115, SigType:2,SignalID:11
2	EQUIP MAIN	INFO	2014-07-29 05:09:12	WEB_USER : Control(Cont.): CtrlValue:1.Result is Successed
3	EQUIP MAIN	INFO	2014-07-29 05:09:15	WEB_USER : Control by WEB: admin,Send Info is: EquipID:115, SigType:2,SignalID:12
4	EQUIP MAIN	INFO	2014-07-29 05:09:15	WEB_USER : Control(Cont.): CtrlValue:1.Result is Successed
5	EQUIP MAIN	INFO	2014-07-29 05:09:28	WEB_USER : Control by WEB: admin,Send Info is: EquipID:115, SigType:2,SignalID:8
6	EQUIP MAIN	INFO	2014-07-29 05:09:28	WEB_USER : Control(Cont.): CtrlValue:1.Result is Successed
7	EQUIP MAIN	INFO	2014-07-29 05:09:33	WEB_USER : Control by WEB: admin,Send Info is: EquipID:115, SigType:2,SignalID:8

SYSTEM INVENTORY MENU

The System Inventory Menu allows you to view product information of the intelligent devices (i.e. rectifiers, converters, SMDUs, IB, etc.) connected to the controller.

Figure 57. System Inventory Menu



Equipment	Product Model	Hardware Revision	Serial Number	Software Revision
NCU	M830D	A00	03131200052	1.11
Rectifier #1	1R482000e3	A02	03131103300	1.05
Rectifier #2	1R482000e3	A02	03131103358	1.05
Rectifier #3	1R482000e3	A02	03131103393	1.05
SMDU 1	1SMDU	A02	03110900081	1.22
EIB 1	1MA455U41	A01	03110300004	1.02
IB 1	1MA4C5U31	A01	03110100193	1.02
SMDUP 1	1SMDU+	A00	03121000039	1.04
SMDUP 2	1SMDU+	A00	03100500014	1.04
Converter #1	C48/241500	A03	03130500202	1.01
Converter #2	C48/241500	A03	03130600435	1.01
Converter #3	C48/241500	A03	03130601273	1.01
SM Temp 1	1SMTEMP	A01	03110300006	2.00

ADVANCED SETTINGS MENU

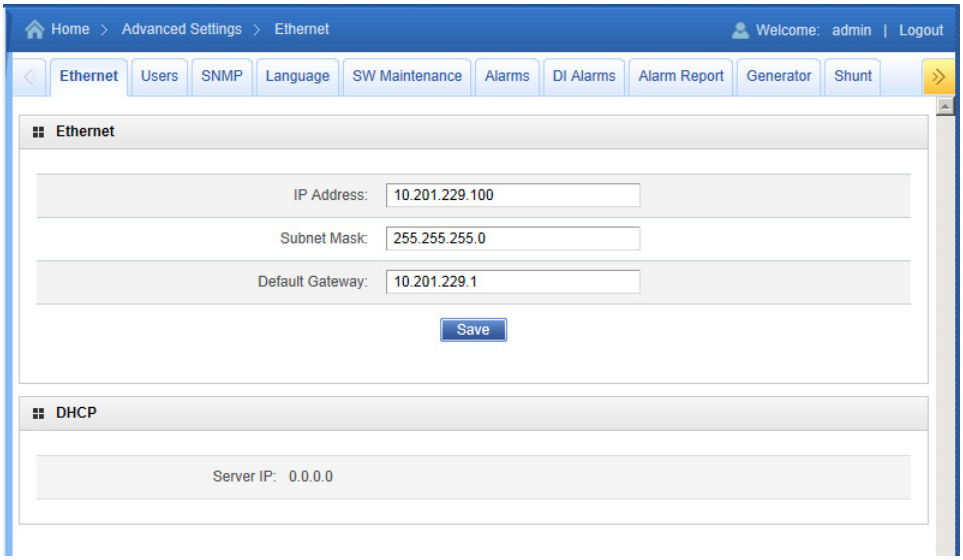
The Advanced Settings Menu allows you to change (if you have the proper privilege level programmed in your User settings) the settings of the various advanced programmable parameters. Settings are grouped per function. Select a tab in the Advanced Settings Menu to change that functions programmable parameters.

Ethernet Tab

You can configure the controller's network parameters, such as the IP Address, Subnet Mask, and Default Gateway. After modifying the network parameters, click "Save" to validate the change made to the parameters.

Note: *After changing the IP Address, you will need to login again with the new IP address.*

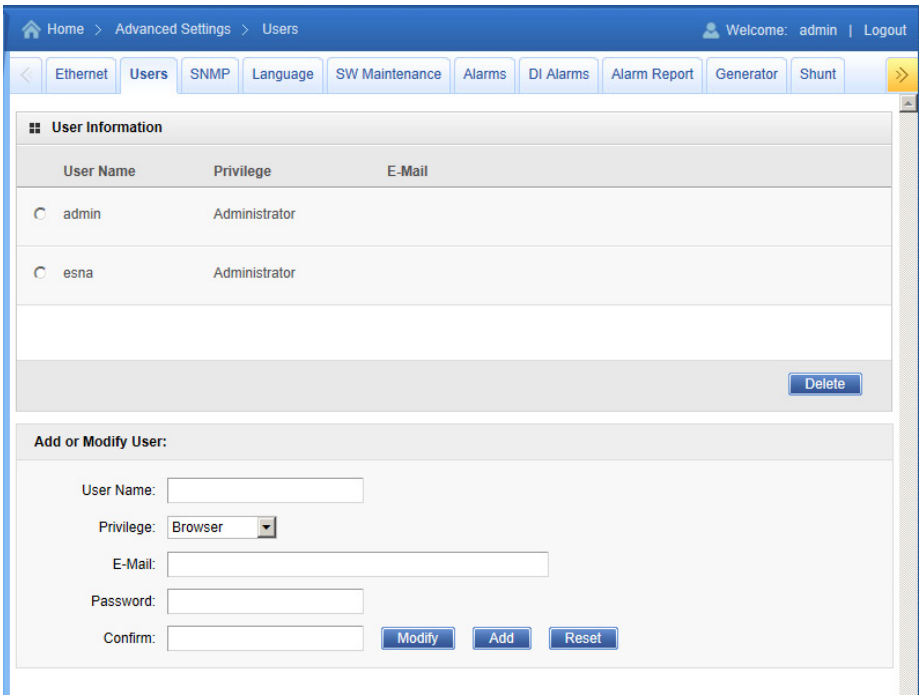
Figure 58. Ethernet Tab



Users Tab

You can add, edit, and delete Users. These are the Users that can log onto the controller both locally (local display access) or remotely using the Web Interface.

Figure 59. Users Tab



Adding a User

1. Enter the User's Name in the "User Name" field (13 characters maximum; the valid characters are 0-9, a-z, A-Z, and _).
2. Select the privilege of the User from those listed in the "Privilege" drop-down list box. See "User Privilege Level" below for a description.
3. Enter an E-Mail address for this User.
4. Enter a password for this User in the "Password" field (13 characters maximum; the valid characters are 0-9, a-z, A-Z, and _). Passwords must be at least six (6) characters long.
5. Re-enter the password for this User in the "Confirm" field.
6. Click the "Add" button to add the User.

Note: *To reset the form (i.e. to start over) and erase all information entered, click on the "Reset" button.*

Modifying an Existing User

1. Select the User to be modified from those listed in the "User Information" list.
2. Modify the parameters of this User in the "User Name", "Privilege ", "E-Mail", and/or "Password" field.
3. Click the "Modify" button to modify the parameters of this User.

Note: *To reset the form (i.e. to start over) and erase all information entered, click on the "Reset" button.*

Deleting a User

1. Select the User to be deleted from those listed in the "User Information" list.
2. Click the "Delete" button to delete this User.

User Privilege Levels

A User is assigned one of the following "Privilege Levels".

Each Privilege Level gives a User access to specific menus. A User has access to his/her level menus, plus all menus of the lesser privilege levels.

Table 6. User Privilege Levels

Access Level (Privilege Level)	Default User Name and Password	Authority
Level A (Browser)	none set	The User can only read (browse) information in the menus.
Level B (Operator)	none set	The User has access to the system "Control" menus.
Level C (Engineer)	none set	The User has access to the system "Settings" menus and can download the configuration package. The User does not have access to update the OS application and modify, add, or delete Users.
Level D (Administrator)	admin, 640275	The User has full access to all menus; including update the OS application and modify, add, and delete Users.

SNMP Tab

Configures SNMP V2 and V3 parameters.

Accepted Trap Level Parameter Description

- **Accepted Trap Level:** Sets SNMP V2 and V3 trap level.

Adding an Entry

1. Enter the parameters in the parameter fields.
2. Click the "Add" button to add the entry.

Note: *To reset the form (i.e. to start over) and erase all information entered, click on the "Reset" button.*

Modifying an Existing Entry

1. Select the Entry to be modified from those listed at the top of the screen.
2. Modify the parameters.
3. Click the "Modify" button to modify the parameters for this Entry.

Note: *To reset the form (i.e. to start over) and erase all information entered, click on the "Reset" button.*

Deleting an Entry

1. Select the Entry to be deleted from those listed at the top of the screen.
2. Click the "Delete" button to delete this Entry.

NMSV2 Configuration Description (Network Management System)

Configures SNMP Version 1 and 2 parameters.

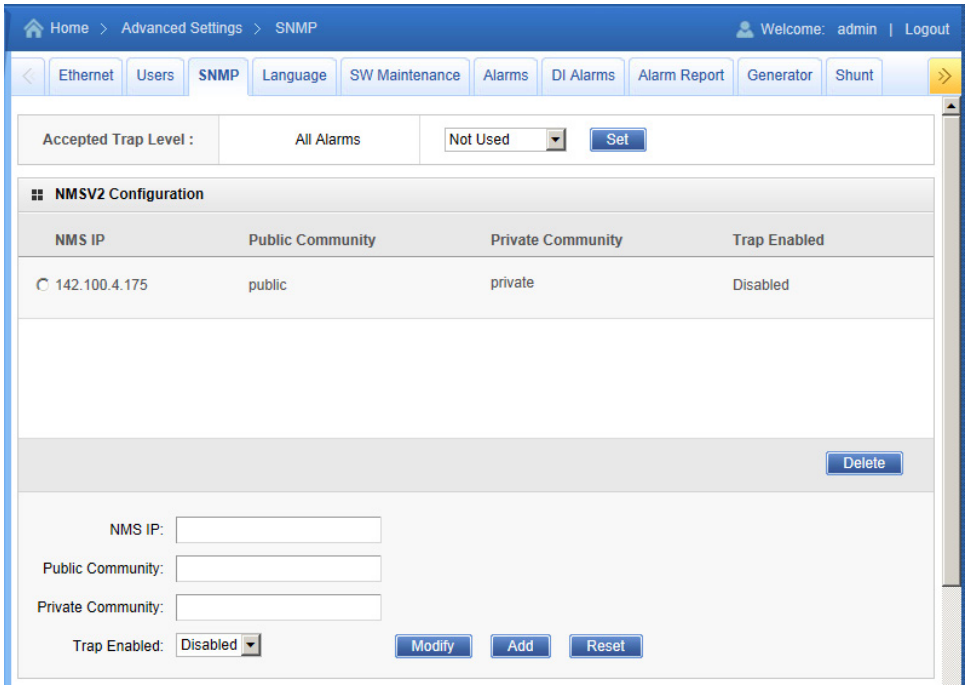
You can configure the following parameters.

- **NMS IP:** The permitted IP to access the NMSV2 agent.
- **Public Community:** The public community string.
- **Private Community:** The private community string.
- **Trap Enabled:** Trap function enabled or disabled.

Note: *Only listed IP Addresses will have SNMP access.*

Note: *To reset the form (i.e. to start over) and erase all information entered, click on the "Reset" button.*

Figure 60. SNMP - NMSV2 Configuration



NMSV3 Configuration Description (Network Management System)

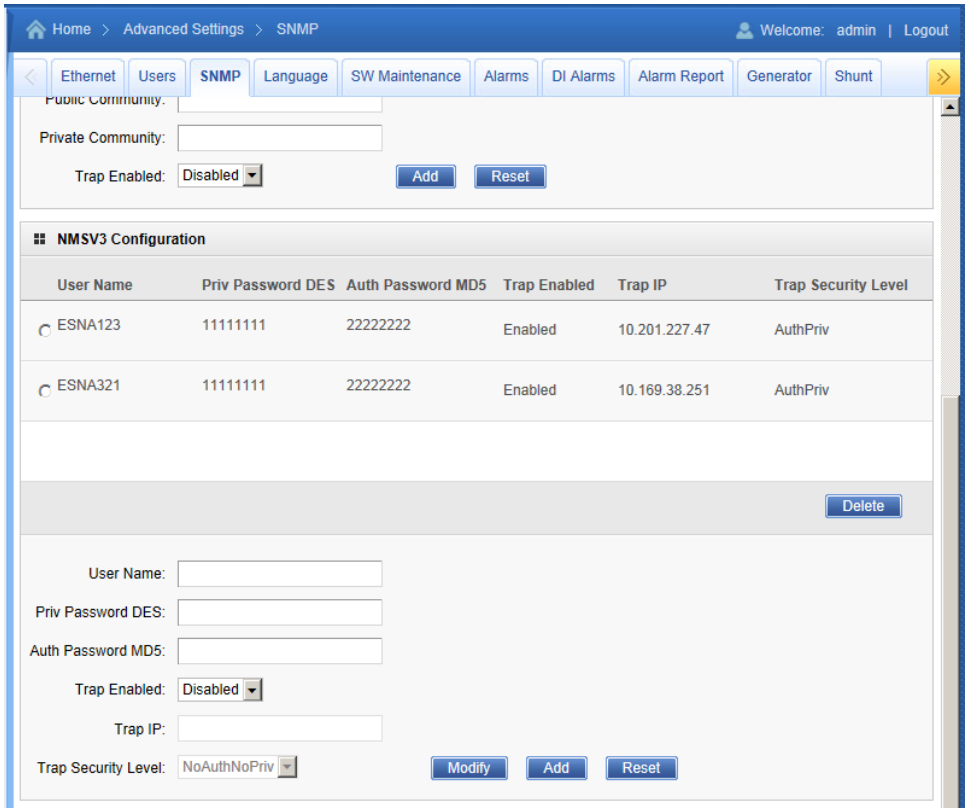
Configures SNMP Version 3 parameters.

You can configure the following parameters.

- **Use Name:** The permitted User to access the NMSV3 agent.
- **Priv Password DES:** The private DES password used to encrypt the data.
- **Auth Password MD5:** The authorization MD5 password used to encrypt the digital signature.
- **Trap Enabled:** Trap function enabled or disabled.
- **Trap IP:** The IP to which the trap is sent.
- **Trap Security Level:** The SNMP v3 data security level (NoAuthNoPriv, AuthNoPriv, or AuthPriv).
  - **NoAuthNoPriv:** SNMP messages are sent without authentication and without privacy.
  - **AuthNoPriv:** SNMP messages are sent with authentication but without privacy.
  - **AuthPriv:** SNMP messages are sent with authentication and with privacy.

Note: *Only listed IP Addresses will have SNMP access.*

Figure 61. SNMP - NMSV3 Configuration



Language Tab

The LCD and Web Interface always has an English language option. Multiple local languages are also supported. One local language option is displayed at a time with the English language option. To select another local language option to display, use the Web Interface Language Tab.

You can select from the following local languages: German, Spanish, French, Italian, Traditional Chinese, and Simplified Chinese. Once you select a new local language, the controller is automatically rebooted to make the selected local language valid.

Figure 62. Language Tab

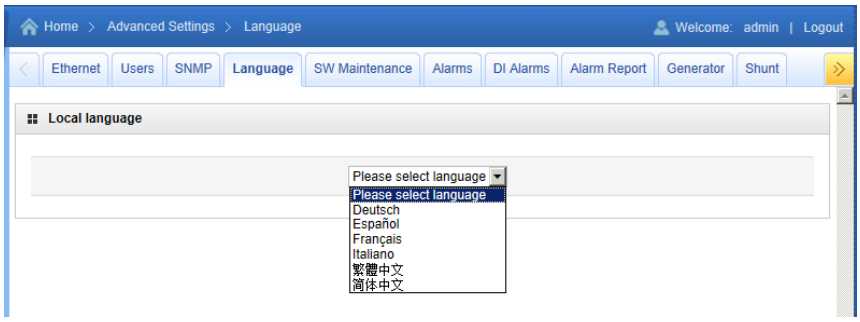
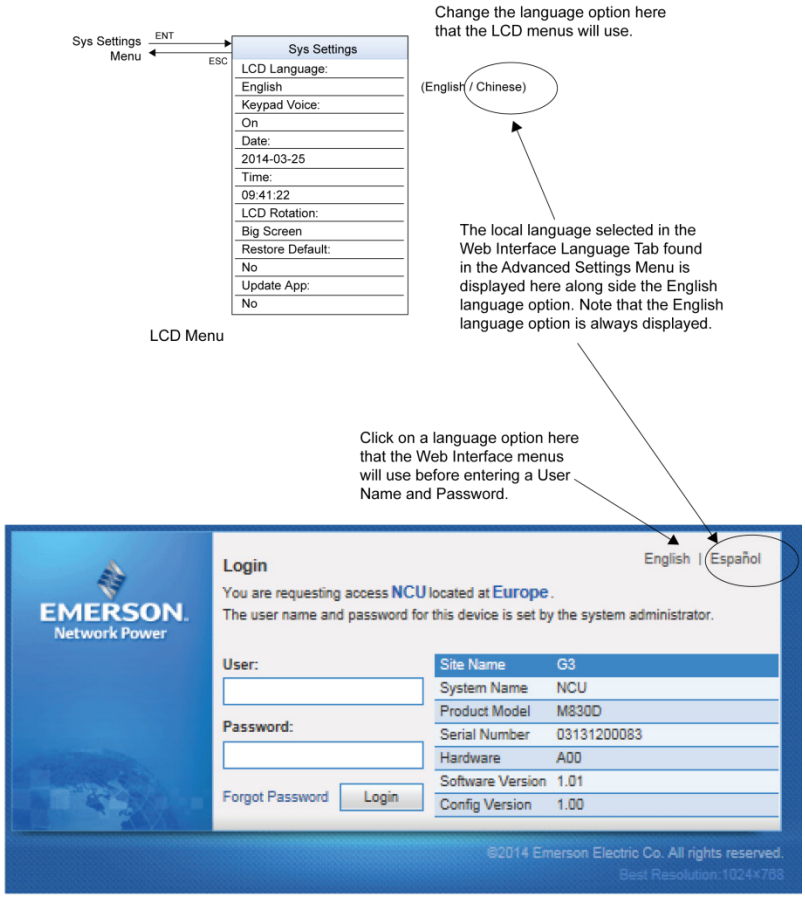


Figure 63. Selecting the Local Language for the LCD and Web Interface Menus

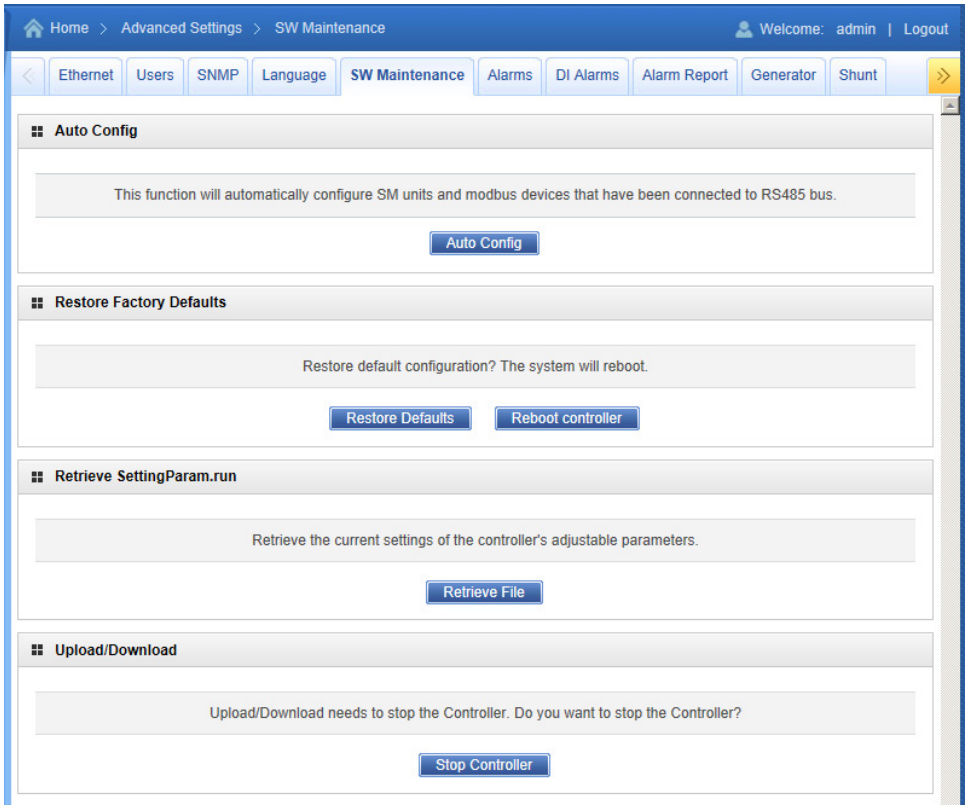


Web Interface Login Screen

SW Maintenance Tab

Allows you to perform software maintenance procedures.

Figure 64. SW Maintenance Tab

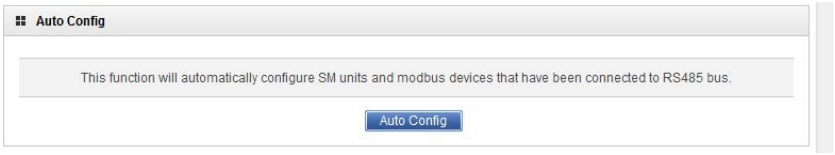


Auto Config Procedure

The auto configuration feature scans the system for intelligent equipment connected to controller (such as SMDU, IB and EIB) and configures these into the controller automatically.

To start the auto configuration process, click on the "Auto Config" button.

Figure 65. Auto Config


Auto Config
This function will automatically configure SM units and modbus devices that have been connected to RS485 bus.
Auto Config

Restore Factory Default Configuration Procedure

See also “Restoring Factory Default Configuration” on page 28.

This procedure is typically used to restore any changes made to any settings, relay assignments, alarm severities, or signal names. This file is not shipped with the system. There are one or two steps required to restore your NCU as shipped.

- One step to restore the factory default configuration (required only if you made any changes to relay assignments, alarm severities, or signal names).
- One step to reload the "SettingParam.run" file (required only if you made any setting changes like float / equalize voltage or alarm thresholds).

Your system may have been configured for specific options at the factory which creates a “SettingParam.run” file. Restoring the factory default configuration returns the system to the settings of the default configuration. These are the settings before specific options may have been configured by the factory. To restore the system to the settings as shipped, after restoring the factory default configuration, you must reload the factory “SettingParam.run” file.

Note: *If a system was shipped with factory modified settings, the system may be supplied with a USB memory device that contains a “SettingParam.run” file as shipped. If provided, the “SettingParam.run” file has a seven-digit UIN (Unique Identification Number) preceding the “SettingParam.run” filename. The UIN identifies a “SettingParam.run” file for use with a specific system. This file can be used to restore your system to the configuration as shipped. Refer to “Reloading a Backed-Up NCU Configuration” on page 27 to reload the supplied “SettingParam.run” file.*

Procedure

WARNING! When this procedure is performed, the controller’s existing configuration and parameter settings will be lost. The “SettingParam.run” file is deleted. Before restoring the factory default configuration, if you have made changes to any setting save the “SettingParam.run” file or if you have made any name changes, relay assignments, or alarm severities save the configuration package (see “Backing Up the NCU Configuration” on page 26).

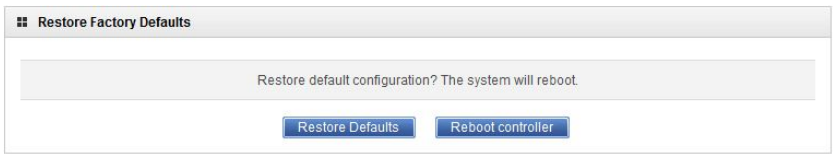
AFTER PERFORMING THIS PROCEDURE, RELOAD THE “SETTINGPARAM.RUN” FILE AND CONFIGURATION PACKAGE, IF REQUIRED.

1. Click on the “Restore Defaults” button.
2. Click “OK” to confirm to overwrite the existing configuration package in memory with the stored configuration package.

The controller will automatically reboot. All settings WILL BE restored to the defaults of the stored configuration package.

Note: *After rebooting, you must exit your browser and re-login to see any changes made.*

Figure 66. Restore Factory Defaults



Retrieve Setting Param.run Procedure

See also “Backing Up the NCU Configuration” on page 26.

A file named “SettingParam.run” is automatically created/appended by the controller whenever a User (or the factory at the time of shipment) makes changes to any parameter settings via the LCD or Web Interface. This file contains changes made to alarm setpoints and other settings such as float / equalize voltage, etc. This file can be saved to your computer so you can restore any custom settings you may have made.

Note: *It is strongly recommended that you save a copy of the SettingParam.run file whenever you customize any parameter settings. Then, if you ever replace the controller or perform a "Restore Defaults" procedure, you can restore your customized settings by downloading the previously saved SettingParam.run file back into the controller.*

Prior to changing settings, ensure the current configuration package and "SettingParam.run" files are backed up. After making changes, create new backup files.

Procedure

1. Click on the “Retrieve File” button to save the file named "SettingParam.run" to your computer. Select where you want the file to be copied to on your computer.

   Note: *Ensure Internet Explorer security settings are set to enable a file to be copied to your computer.*

   To aid in file management, you may change the name of the “SettingParam.run” file to differentiate it from other "SettingParam.run" files saved. The new name can use alpha and numeric characters preceding the original “SettingParam.run” name (the end of the new file name **must** always be “SettingParam.run”; for example, an acceptable filename would be “seville4SettingParam.run”).

Figure 67. Retrieve SettingParam.run

Upload/Download Procedure

See also “Backing Up the NCU Configuration” on page 26, “Reloading a Backed-Up NCU Configuration” on page 27, and “Upgrading the NCU Using an Application ("All") Package” on page 27.

You can download (from your computer into the controller) a configuration package, application ("All") package, language package (filename of each has a tar or tar.gz extension), or “SettingParam.run file”.

You can upload (from the controller to your computer) a configuration package or language package.

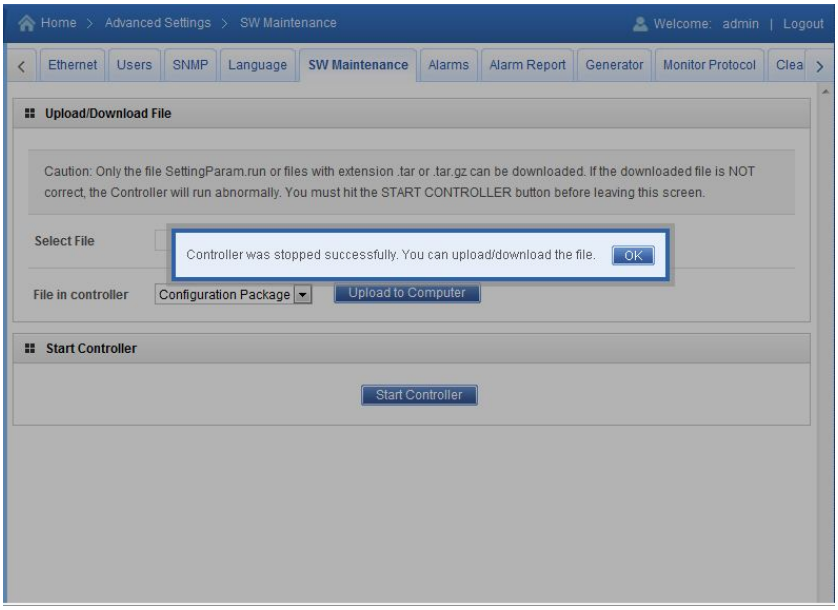
Procedure

1. To upload or download a file, you need to shut down the controller first. When you select the SW Maintenance Tab, click on the “Stop Controller” button.

Figure 68. Upload/Download - Stop Controller

2. The following window opens.

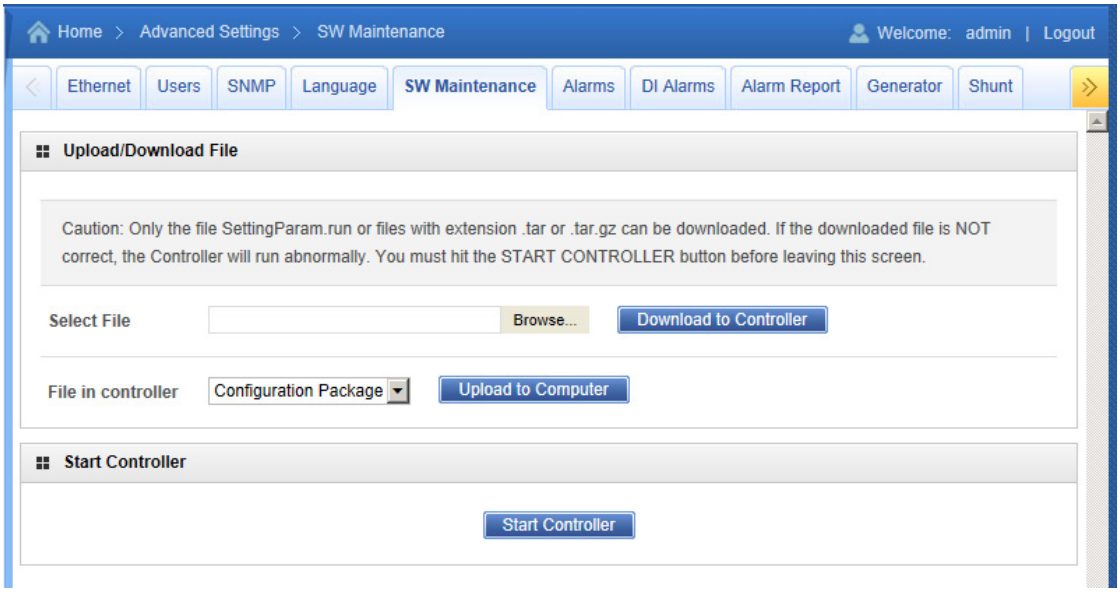
Figure 69. Upload/Download --Controller Stopped


Home > Advanced Settings > SW Maintenance
Welcome: admin | Logout
Ethernet
Users
SNMP
Language
SW Maintenance
Alarms
Alarm Report
Generator
Monitor Protocol
Upload/Download File
Caution: Only the file SettingParam.run or files with extension .tar or .tar.gz can be downloaded. If the downloaded file is NOT correct, the Controller will run abnormally. You must hit the START CONTROLLER button before leaving this screen.
Select File
Controller was stopped successfully. You can upload/download the file.
OK
File in controller
Configuration Package
Upload to Computer
Start Controller
Start Controller

3. Click "OK".

4. The following window opens.

Figure 70. Upload/Download File



WARNING! Never navigate from this Web page without first clicking on "Start Controller". If you do, you will not have Web access. A manual system reset is required to restore Web access.

5. To **download** (from your computer into the controller) a configuration package, application ("All") package, language package, or a "SettingParam.run" file; click the "Browse..." button and navigate to the folder where the file to download is located. Select the file to be downloaded and then click the "Download to Controller" button. Click "Start Controller" to restart the controller with the downloaded file installed.

   To **upload** a file to your computer, select "Configuration Package" or "Language Package" from the "File in Controller" drop-down list box, and click on the "Upload to Computer" button to save the file to your computer. Select where you want the file to be copied to on your computer. Click "Start Controller" to restart the Controller.

WARNING! A configuration package can only be downloaded to a controller with the same software version the file was created from. This file is NOT forward compatible.

Note: *Ensure Internet Explorer security settings are set to enable a file to be copied to your computer.*

Note: *A Configuration Package is a package of files containing all the default parameter settings and any User changes to alarm severity levels, relay assignments, and signal names.*

Note: *An Application "All" package file has both the application (software) and configuration package and is usually supplied for an application upgrade.*

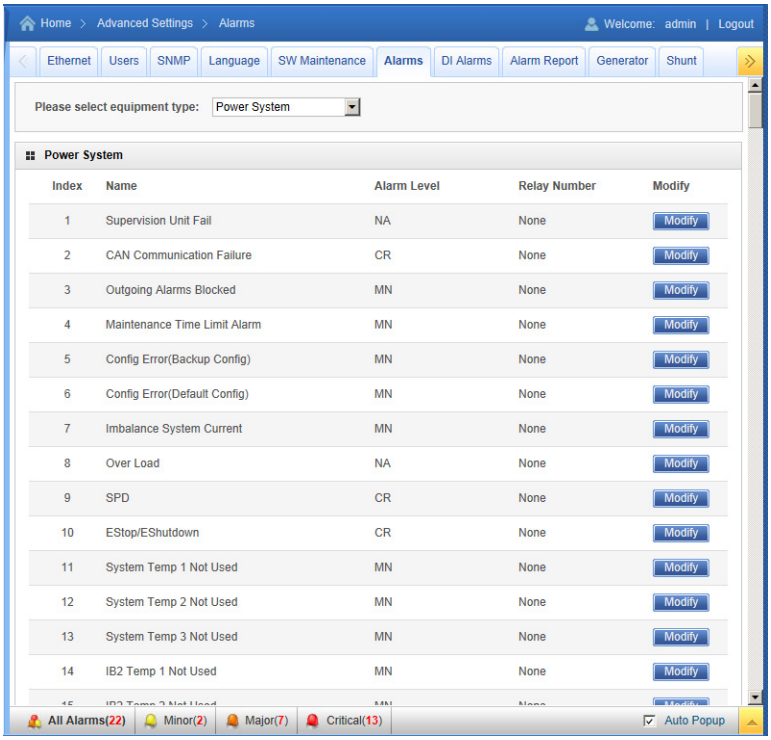
Note: *A Language Package is a package of files containing all the default names of the parameters in two languages. Typically these would be in English and Chinese. The language package cannot be changed by the User. Consult Emerson if a different language package is required.*

Note: *A file named "SettingParam.run" is automatically created/appended by the Controller whenever a User (or the factory at the time of shipment) makes changes to any parameter settings via the LCD or Web Interface.*

Alarms Tab

- Allows you to define the alarm level for each alarm.
- Allows you to map alarms to the alarm relays.

Figure 71. Alarms Tab

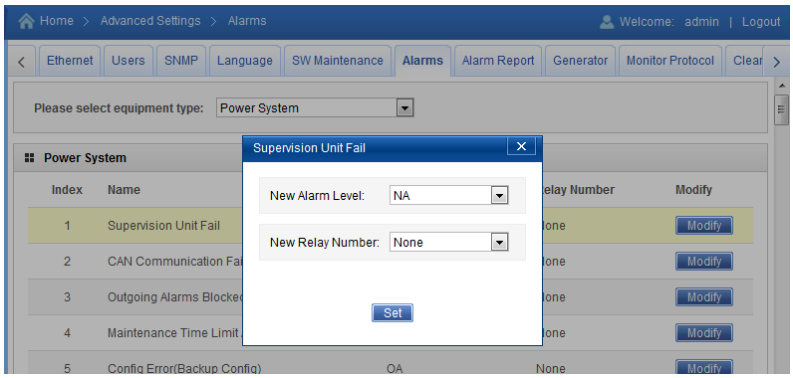


Procedure

1. Select the equipment type to display the alarms associated to it. Also displayed is the alarm level and alarm relay number assigned to this alarm.
2. To modify the alarm level and/or alarm relay number, click on the "Modify" button for that alarm signal.
3. The following window opens. Select the New Alarm Level and/or New Relay Number and click on "Set".

   "None" means there is no related relay number.

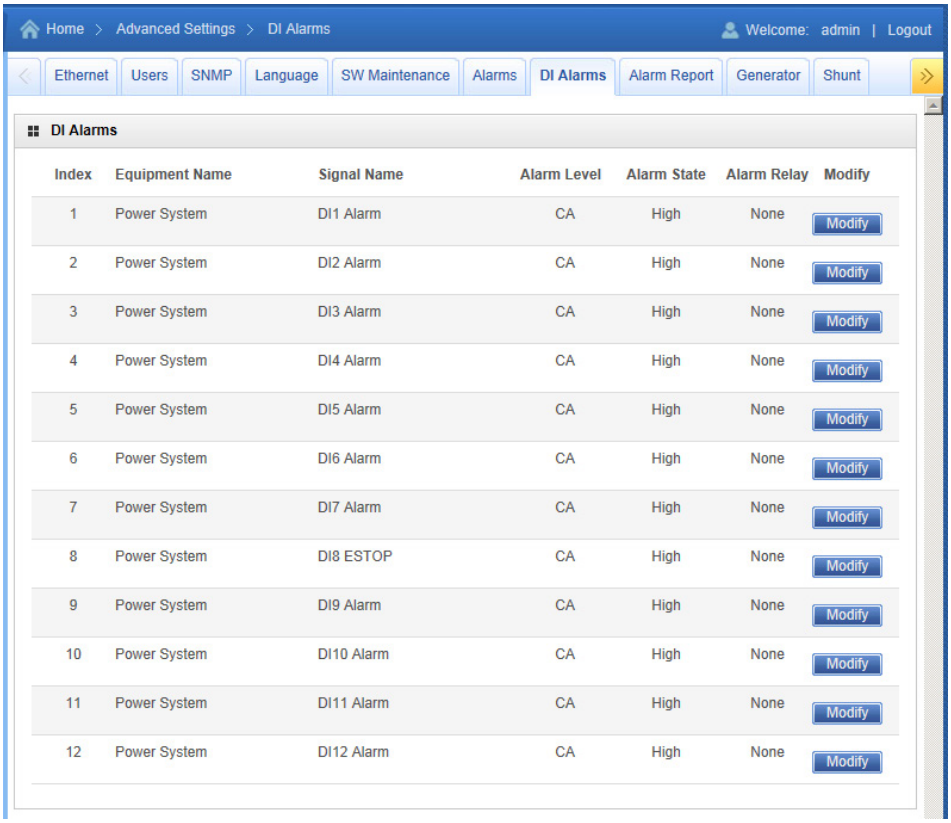
Figure 72. Setting Alarm Level / Relay Number



DI Alarms Tabs

- Allows you to change the digital input alarm signal full name (name displayed in the Web Interface menus).
- Allows you to change the digital input alarm signal abbreviation name (name displayed in the local display menus).
- Allows you to define the alarm level for each digital input alarm.
- Allows you to map the digital input alarms to the alarm relays.
- Allows you to set the alarm state for the digital inputs (high or low).

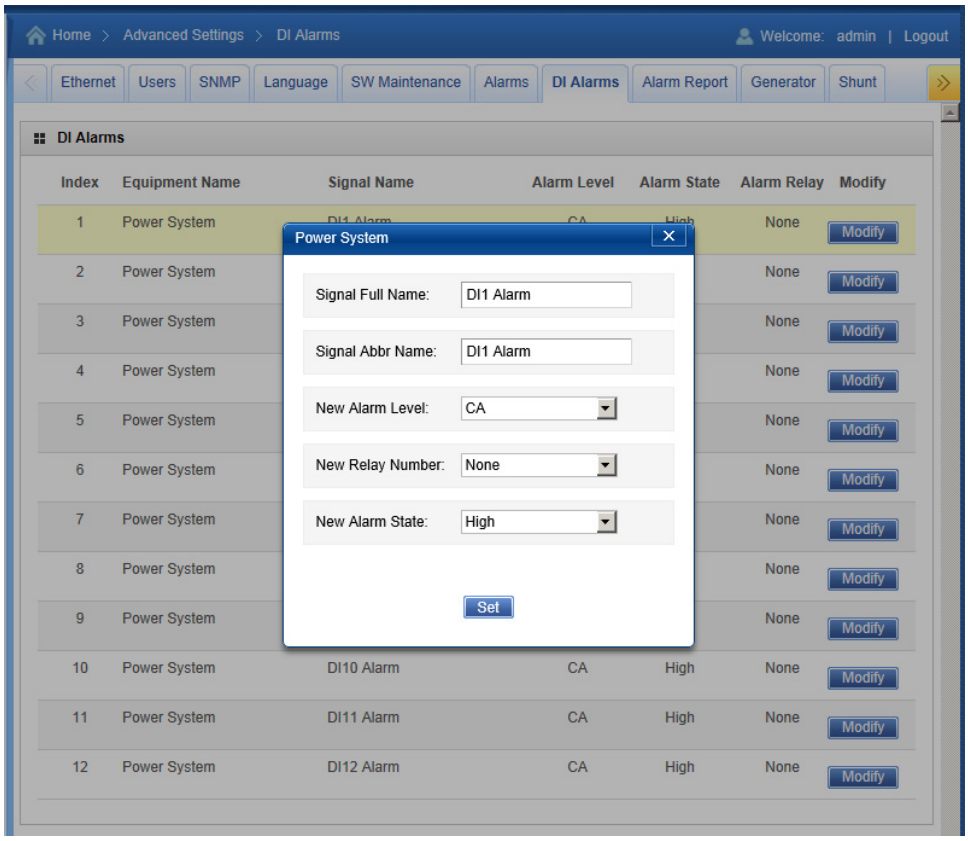
Figure 73. DI Alarm Tab


Home > Advanced Settings > DI Alarms
Welcome: admin | Logout
Ethernet
Users
SNMP
Language
SW Maintenance
Alarms
DI Alarms
Alarm Report
Generator
Shunt
DI Alarms
Index
Equipment Name
Signal Name
Alarm Level
Alarm State
Alarm Relay
Modify
1 Power System DI1 Alarm CA High None Modify
2 Power System DI2 Alarm CA High None Modify
3 Power System DI3 Alarm CA High None Modify
4 Power System DI4 Alarm CA High None Modify
5 Power System DI5 Alarm CA High None Modify
6 Power System DI6 Alarm CA High None Modify
7 Power System DI7 Alarm CA High None Modify
8 Power System DI8 ESTOP CA High None Modify
9 Power System DI9 Alarm CA High None Modify
10 Power System DI10 Alarm CA High None Modify
11 Power System DI11 Alarm CA High None Modify
12 Power System DI12 Alarm CA High None Modify

Procedure

1. To modify the digital input alarm parameters, click on the “Modify” button for that digital input alarm signal.
2. The following window opens.

Figure 74. Setting DI Alarm



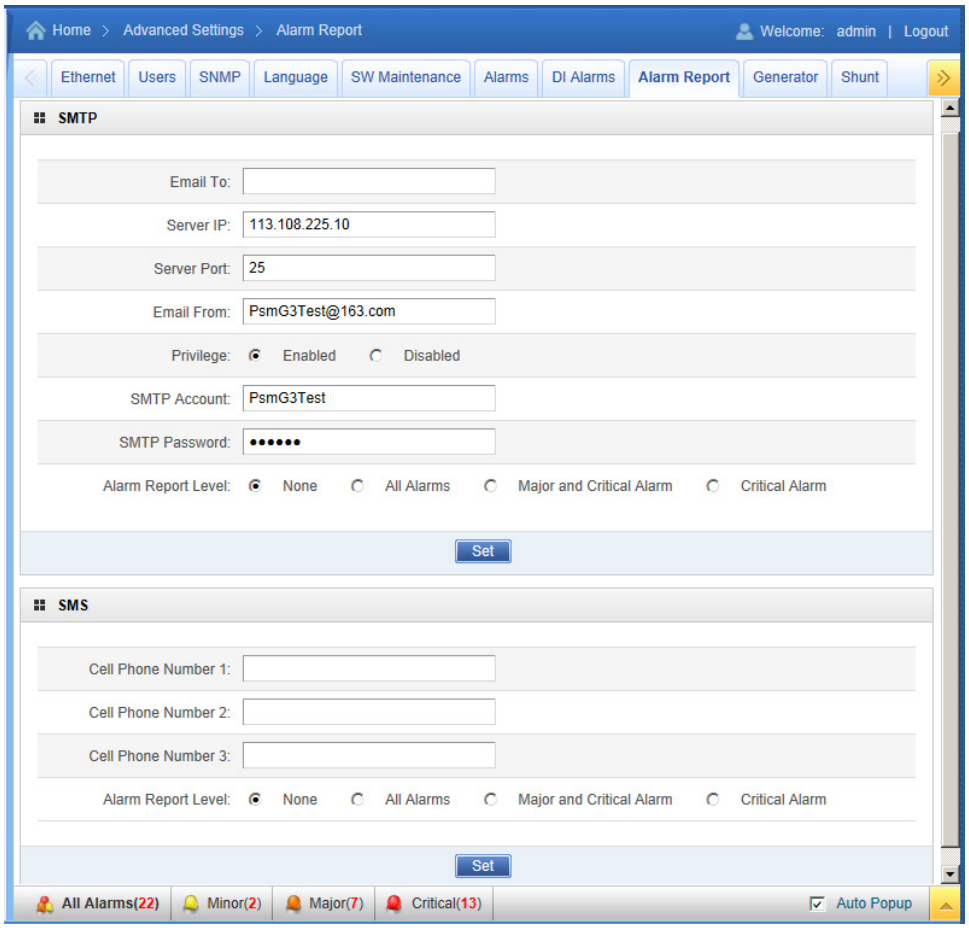
3. Change the following parameters as desired and click on “Set”.
   - **Signal Full Name:** Name displayed in the Web Interface menus.
   - **Signal Abbr Name:** Name displayed in the local display menus.
   - **New Alarm Level:** Alarm level for this digital input alarm.
   - **New Relay Number:** Select a relay number to map to this digital input alarm. “None” means there is no related relay number.
   - **New Alarm State:** Select high or low to set the alarm state for the digital input.

Alarm Report Tab

- In the SMTP, you can set email address for receiving alarm reports and the alarm report level.
- In SMS, you can set cell phone number for receiving alarm reports and the alarm report level.

Note: *A GSM modem must be connected to the USB port of the NCU for SMS functionality.*

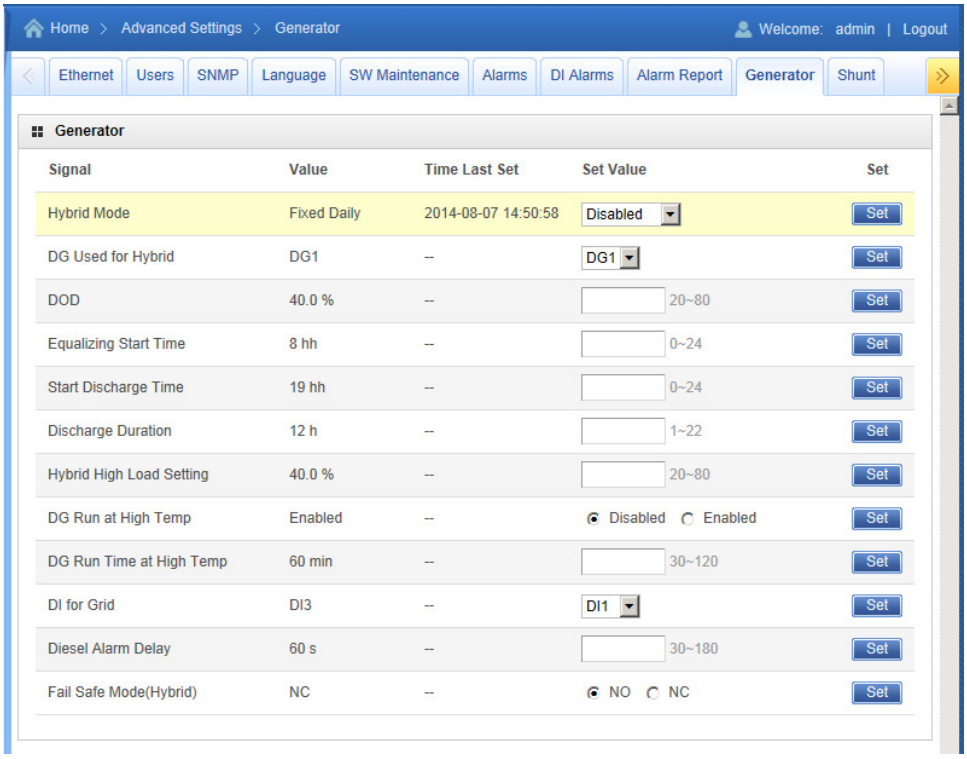
Figure 75. Alarm Report Tab



Generator Tab

If you have a special configuration with this feature, you can set the various generator related parameters.

Figure 76. Generator Tab



Changing Programmable Parameters in the Generator Tab

To change a programmable parameter, select or enter a new value for the parameter then click on "Set" to change the value.

Generator Tab Programmable Parameter Descriptions

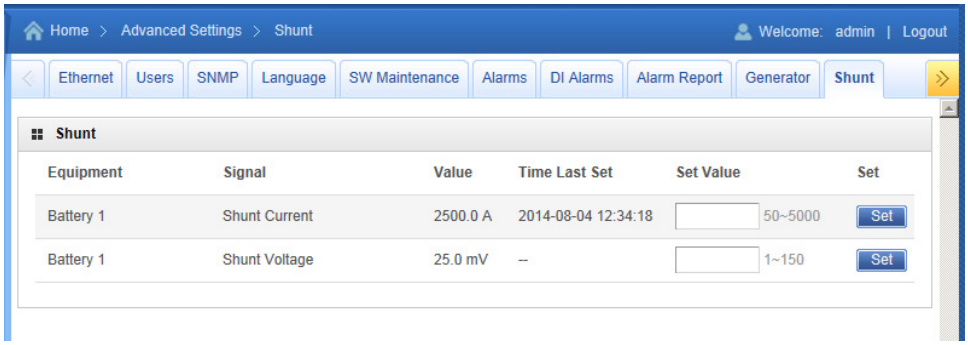
- **Hybrid Mode:** Refer to "Hybrid Control Function (Supporting Generator, Solar and Wind Energy Input, and Optimization)" on page 7 for more information on the Hybrid Mode.
  - **Disabled, Capacity, or Fixed Daily:** Sets the Hybrid Mode or disables the function.
- **DG Used for Hybrid:** Sets the diesel generator(s) to be utilized.
- **DOD:** Sets the Depth of Discharge (DOD).
- **Equalizing Start Time:** Sets the start time for equalizing.
- **Start Discharge Time:** Sets the start time for discharge.
- **Discharge Duration:** Sets the discharge duration.
- **Hybrid High Load Setting:** Sets the hybrid high load point.
- **DG Run at High Temp:** Enables or disables diesel generator operation in the high temperature condition.

- **DG Run Time at High Temp:** Sets the diesel generator run time in the high temperature condition.
- **DI for Grid:** Sets the digital input monitoring the grid.
- **Diesel Alarm Delay:** Sets diesel alarm delay.
- **Fail Safe Mode (Hybrid):** Tells the controller the fail safe mode of the relay contacts connected to start the generator(s) (either normally open or normally close).

Shunt Tab

You can set shunt current and shunt voltage for batteries. Enter value and click on SET.

Figure 77. Shunt Tab



Power Split Tab

You can configure the advanced power split parameters and associated digital input signals. Refer to “Power Split Feature” on page 6 and “Power Split Feature” on page 28 for more information on the Power Split feature.

Figure 78. Power Split Tab

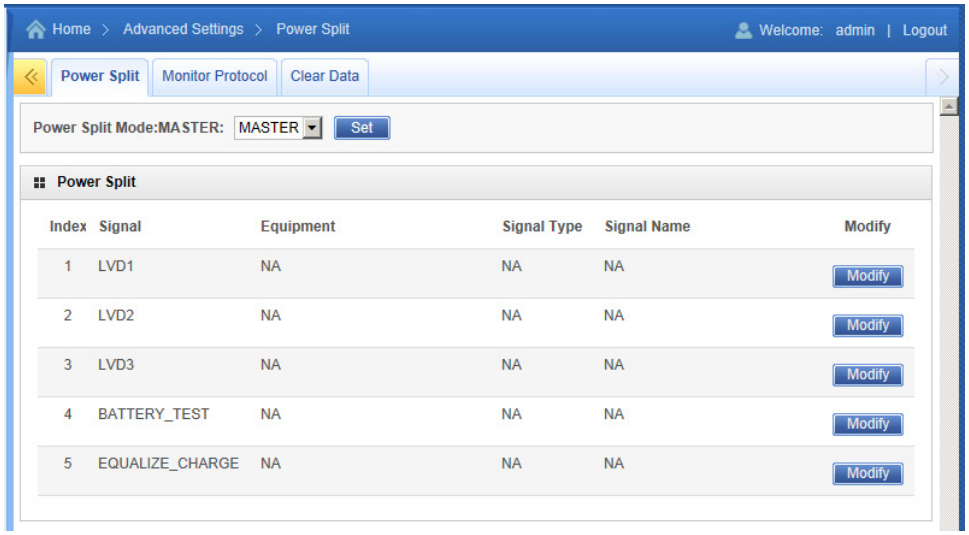
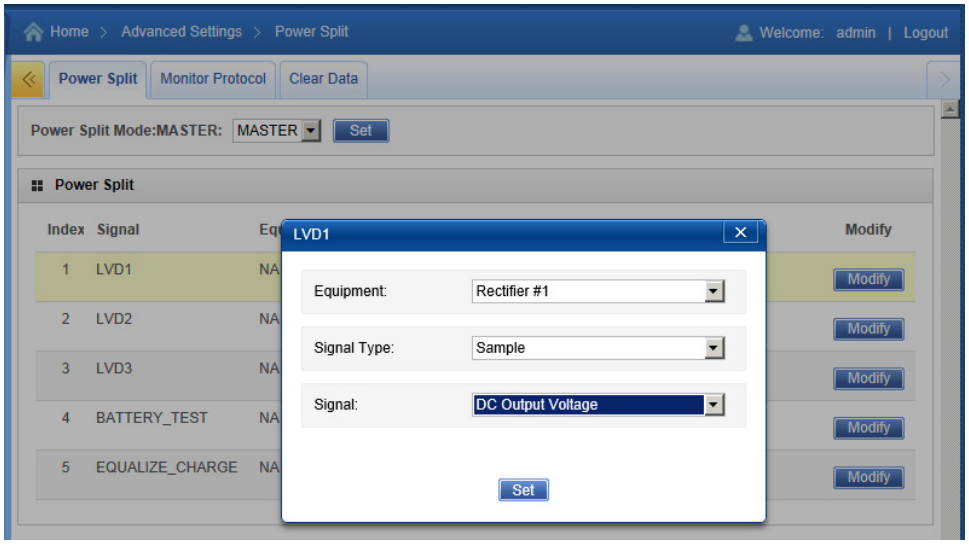

Home > Advanced Settings > Power Split
Welcome: admin | Logout
Power Split
Monitor Protocol
Clear Data
Power Split Mode:MASTER: MASTER Set
Power Split
Index Signal Equipment Signal Type Signal Name Modify
1 LVD1 NA NA NA Modify
2 LVD2 NA NA NA Modify
3 LVD3 NA NA NA Modify
4 BATTERY_TEST NA NA NA Modify
5 EQUALIZE_CHARGE NA NA NA Modify

Figure 79. Power Split Settings



Procedure

1. Select the power split mode (Master or Slave). Click on SET.

Procedure

If low voltage disconnect functions are to be used in a power split configuration, they must be implemented in the existing power system and signals from its control unit must be connected to the NCU.

1. For LVD1, LVD2, and/or LVD3; click on the “Modify” button and select the NCU digital inputs connected to the low voltage disconnect control circuits.

Procedure

If the battery test function is to be used in a power split configuration, battery test must be implemented in the existing power system and a test signal from its control unit must be connected to the NCU.

1. For BATTERY_TEST, click on the “Modify” button and select the NCU digital input connected to the existing systems battery test control circuit.

Procedure

If the equalize charge function is to be used in a power split configuration, equalize charge must be implemented in the existing power system and an equalizing signal from its control unit must be connected to the NCU.

1. For EQUALIZE_CHARGE, click on the “Modify” button and select the NCU digital input connected to the existing systems equalize control circuit.

Monitor Protocol Tab

You can select "EEM", "YDN23", or "Modbus" as the protocol. To make the new protocol valid, click the “Valid after Restart" button.

Figure 80. Monitor Protocol Tab

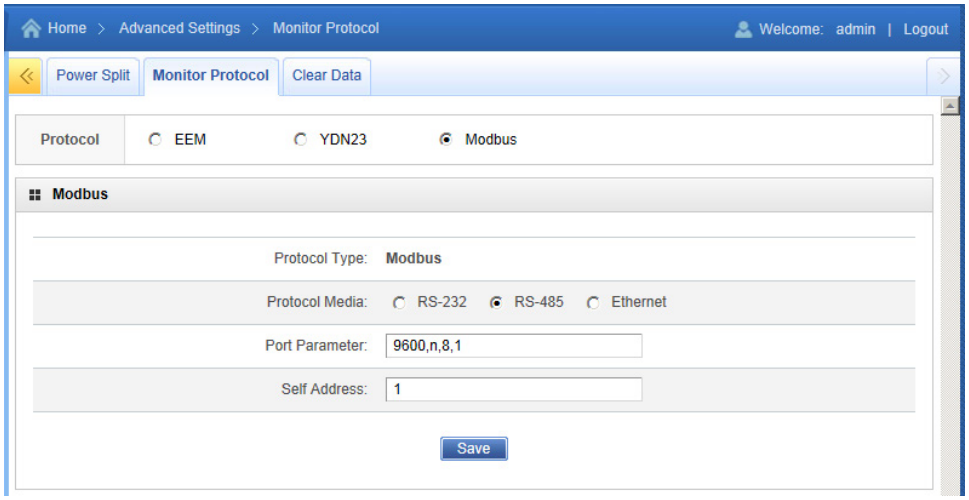
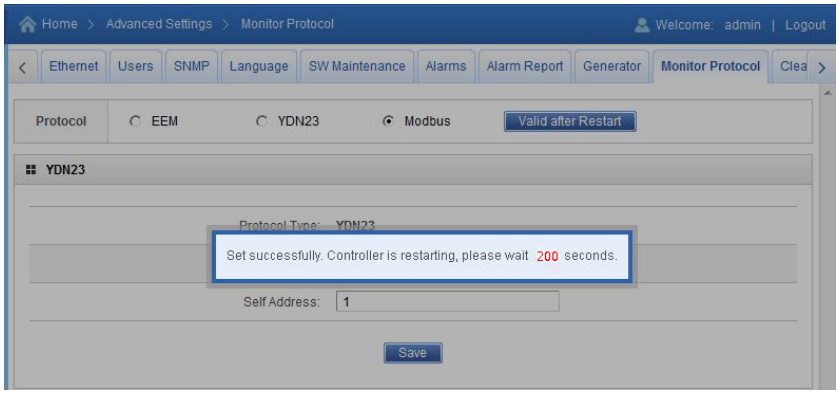


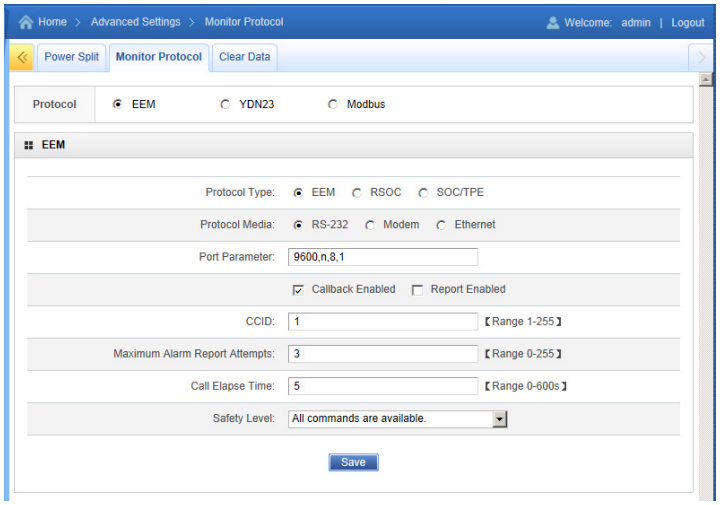
Figure 81. Valid after Restart



EEM Protocol

You can set EEM protocol parameters.

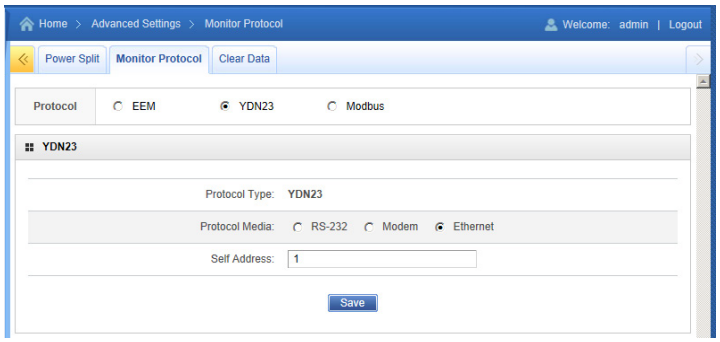
Figure 82. EEM Protocol



YDN23 Protocol

You can set YDN23 protocol parameters.

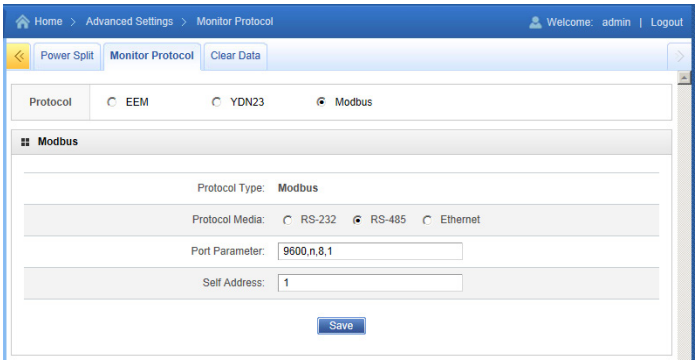
Figure 83. YDN23 Protocol



Modbus Protocol

You can set Modbus protocol parameters.

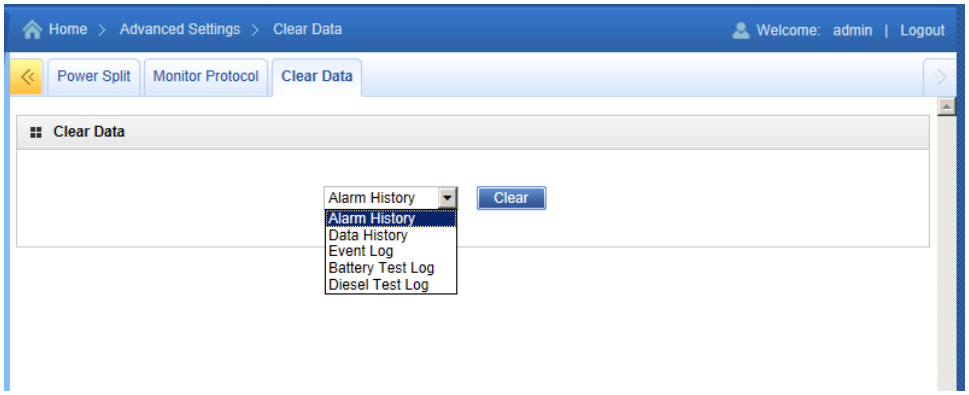
Figure 84. Modbus Protocol



Clear Data Tab

Select the data log to be cleared from those listed in the drop-down list box. Click on the "Clear" button to clear the corresponding data.

Figure 85. Clear Data



Accessing the Controller via a Network Management System (NMS)

General

The controller has an SNMP agent function.

Users can use a Network Management System (NMS) to do following operations:

- Query the operation status and input/output signals of the devices connected to the controller.
- Browse the active alarms.

When the controller generates alarms, the SNMP agent can be configured to notify the NMS through TRAPS automatically.

NMS Supported by SNMP Agent

SNMP is a technology used for network management. The technology is based on implementing an information base called MIB (Managed Information Base). This MIB contains parameters that are of interest from a management perspective. All LAN connected equipment that supports SNMP also supports a default MIB called MIB-II.

The SNMP Agent responds to requests received via the SNMP protocol and also actively sends TRAPS to a specified manager when certain MIB values change state. This is used to actively inform a manager when an alarm situation is recognized.

NMS SUPPORTED BY SNMP V2

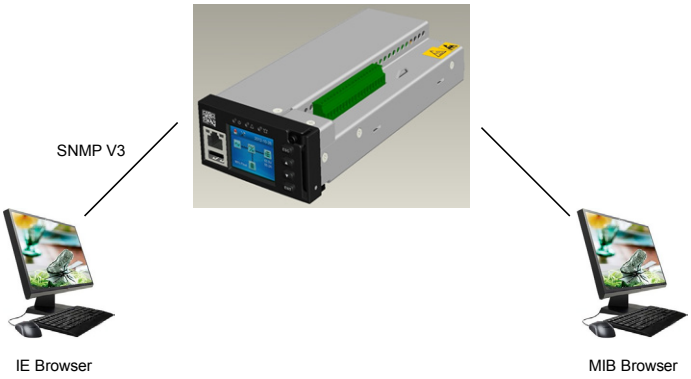
The SNMP agent of the controller supports SNMPv2.

All the NMS that supports SNMPv2c can be used to access the controller. The NMS includes HP OpenView, IBM NetView, Novell ManageWise, SunNet Manager, and so on.

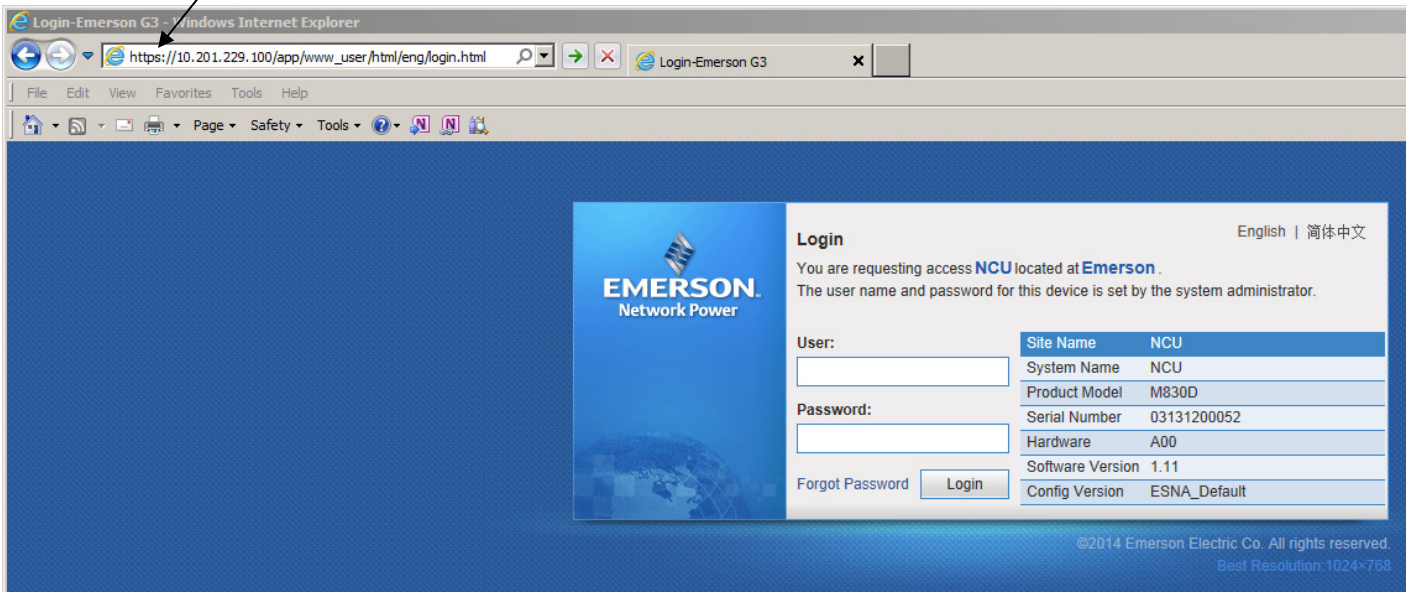
NMS SUPPORTED BY SNMP V3

The NCU has SSL and SNMP V3 function, which makes the NCU more powerful and more secure.

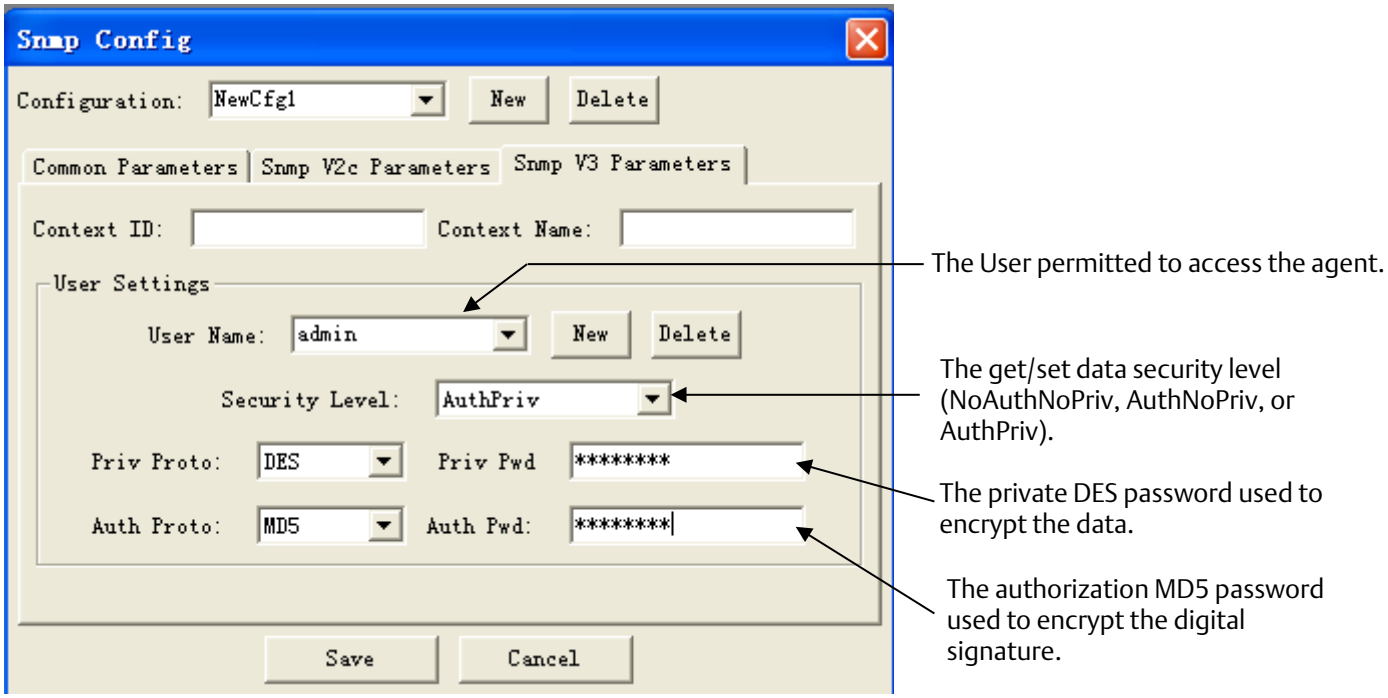
With SSL, you can browse/set the Webpage with https. Data is encrypted in the transmission. You can also browse/set the MIB library with SNMP v3. Data is also encrypted in the transmission.



Use HTTPS here.



PARAMETER SETTING IN SNMP MANAGER



MIB Installation

INSTALLATION

The Controller's MIB is named "Netsure_ESNA.mib". Contact your Emerson representative for the location on the Web to download the MIB file.

Use the MIB loading function of the NMS to load the MIB database. Refer to the User Manual provided with the NMS for the detailed loading method.

CONTENTS OF THE CONTROLLER'S MIB

The contents of the MIB supported by the controller's SNMP agent and the OID are listed in Table 7. For the details, refer to the MIB file named "Netsure_ESNA.mib".

Table 7. Contents of the Controller's MIB

Table 7

Ident Group	Controller Ident Group	
identManufacturer	The name of the equipment manufacturer.	R
identModel	The manufacturers model designation of the power system.	R
identControllerFirmwareVersion	The firmware (software) version of the controller.	R
identName	The name of the power plant. This object should be set by the administrator.	R/W

Table 7

Ident Group	Controller Ident Group	
System Group	**Controller System Value Group**	
systemStatus	Status of the complete plant (highest alarm). One of... (1) unknown - status has not yet been defined (2) normal - there are no activated alarms (3) warning - OA, lowest level of 'abnormal' status (4) minor - A3 (5) major - MA (6) critical - CA, highest level of 'abnormal' status (7) unmanaged (8) restricted (9) testing (10) disabled	R
systemVoltage	System voltage, stored as mV.	R
systemCurrent	System current, stored as mA.	R
systemUsedCapacity	Used capacity, stored as percentage of the total capacity .	R
psBattery Group	**Power System Battery Group**	
psBatteryVoltage	Battery voltage, stored as mV.	R
psBatteryCurrent	Battery current, stored as mA.	R
psInput Group	**Power System Input Group**	
psInputLineAVoltage	The AC line A voltage, stored as mV.	R
psInputLineBVoltage	The AC line B voltage, stored as mV.	R
psInputLineCVoltage	The AC line C voltage, stored as mV.	R
psTemperature Group	**Power System Temperature Group**	
psTemperature1	The first route temperature, stored as 0.001 Celsius degree.	R
psTemperature2	The second route temperature, stored as 0.001 Celsius degree.	R
psStatusCommunication	The status of communication with the Power System. (1) unknown (2) normal (3) interrupt indicates some errors occurred between Power System and agent	R

Table 7

Ident Group	Controller Ident Group	
psStatusBatteryMode	The status of battery modes. (1) unknown (2) FloatCharging (3) ShortTest (4) EqualizeChargingForTest (5) ManualTesting (6) PlanTesting (7) ACFailTesting (8) ACFail (9) ManualEqualizeCharging (10) AutoEqualizeCharging (11) CyclicEqualizeCharging (12) MasterEqualizeCharging (13) MasterBatteryTesting	R
SM Series Group	**Supervisory Module Group**	
psSMACNumber	The number of SM AC module.	R
psSMBATNumber	The number of SM BAT module.	R
psSMIONumber	The number of SM IO module.	R
Alarm Trap Group	**Controller Alarm Trap Group**	
alarmLastTrapNo	The sequence number of last submitted alarm trap.	R
alarmTrapTable (alarmTrapEntry)	Table holding information about the submitted alarm traps. alarmTrapEntry is the entry (conceptual row) in the alarmTrapTable.	R
alarmTrapNo	The unique sequence number of this alarm trap.	R
alarmTime	Date and time when event occurred (local time), including timezone if supported by Controller.	R
alarmStatusChange	The type of alarm change. One of... (1) activated (2) deactivated	R
alarmSeverity	The severity of the alarm. One of... (1) warning - OA, lowest level of alarm severity (2) minor - A3 (3) major - MA (4) critical - CA, highest level of alarm severity	R
alarmDescription	Free-text description of alarm.	R
alarmType	Alarm type, i.e. an integer specifying the type of alarm.	R

Table 7

Ident Group	Controller Ident Group	
Traps	Alarm Traps Info	
--	The SNMP agent can send the active alarms to the specified NMS and the User can define the lowest severity of the NMS accepted alarms.	--

In Table 7, R means OID is read-only (GET), and R/W means OID can be read and modified (GET/SET).

Accessing the Controller through an NMS

APPLY ADMINISTRATIVE PRIVILEGE

In order to use the NMS to manage the devices connected to the controller, the administrative authority needs to be applied for the NMS, that is, add the NMS information to the access list of SNMP agent.

Add NMS through Web Browser

Refer to “NMSV2 Configuration Description (Network Management System)” on page 132 and “NMSV3 Configuration Description (Network Management System)” on page 133 for the method of adding NMS.

ESR Configure

The EEM Protocol is used for communication between the Main Computer and the controller. The Main Computer is the computer superior to the NCU (the client of the NCU). On this page, all parameters needed for communication with a main EEM computer are to be set.

User Information Configuration: On this page, Users, their privilege and password are configured.

Time Synchronization: On this page, the system time and date are to be set.

Automatic time synchronization from time servers can also be configured.

Replacement Procedures

NCU Replacement

DANGER! Follow all "Important Safety Instructions" found in the documentation provided with the system the NCU+ Controller is installed in.

WARNING! *NCU CONTROLLER HANDLING. Installation or removal of the NCU Controller requires careful handling. To avoid possibility of NCU Controller damage from static discharge, a static wrist strap grounded through a one megohm resistor should always be worn when handling the NCU Controller. ESD-protective packaging material must also be used when carrying/shipping the NCU Controller.*

Note: *Depending on your network security settings, when you remove a device that is connected to your network and assign the same IP address to the replacement device, you may not be allowed to communicate with the replacement device over the network. Contact your network administrator for assistance.*

The NCU is hot swappable. It can be removed and installed with the system operating and without affecting the output bus.

Procedure

1. Before performing this procedure, ensure the replacement NCU contains the same configuration file as the existing NCU. Refer to the Configuration File Part Number Label on the side of the replacement NCU for the Configuration Part Number (see Figure 86). If the existing controller is operational, navigate the menus to view its configuration file (MAIN SCREEN / ESC).
2. Performing this procedure may activate external alarms. Do one of the following. If possible, disable these alarms. If these alarms cannot be easily disabled, notify the appropriate personnel to disregard any future alarms associated with this system while this procedure is being performed.
3. Connect an approved grounding strap to your wrist. Attach the other end to a suitable ground.
4. Loosen the captive fastener securing the latch mechanism to the front of the replacement NCU. Pull the latch mechanism away from the NCU (this will retract the latch mechanism located on the bottom of the NCU). This unlocks the NCU from the shelf. Refer to Figure 87.
5. Slide the NCU Controller completely from the shelf.
6. Loosen the captive fastener securing the latch mechanism to the front of the replacement NCU. Pull the latch mechanism away from the NCU (this will retract the latch mechanism located on the bottom of the NCU).
7. Slide the NCU completely into its mounting position.
8. Push the latch mechanism into the front panel of the NCU, and secure by tightening the captive fastener. This locks the NCU securely to the shelf.
9. Wait for the controller to finish booting and verify that the complete system operates normally.
10. Enable the external alarms, or notify appropriate personnel that this procedure is finished.
11. Ensure that there are no local or remote alarms active on the system.

Figure 86. NCU Configuration Label Location

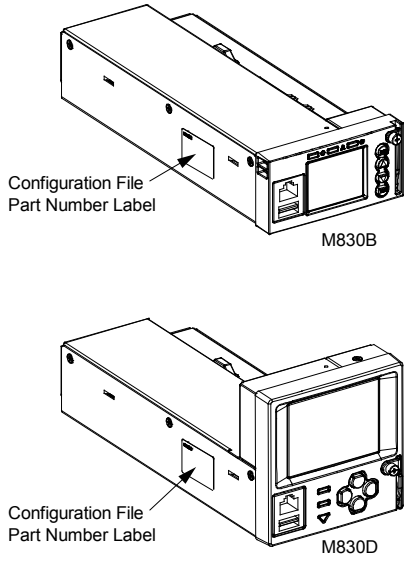
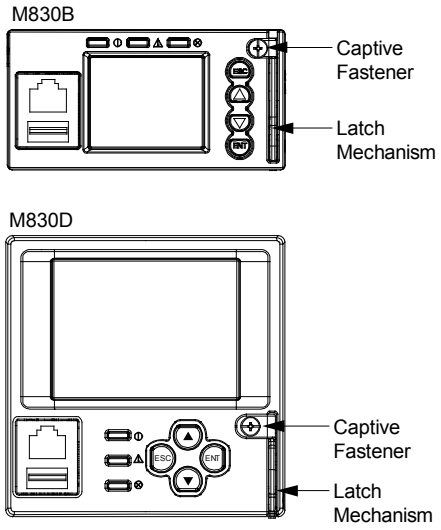


Figure 87. Latch Mechanism on the NCU



Specifications

Input Voltage Range: 19 VDC to 60 VDC.

Power Consumption: 5 W.

Operating Temperature Range: -40 °C (-40 °F) to +75 °C (+167 °F).

Humidity: Capable of operating in an ambient relative humidity range of 0% to 90%, non-condensing.

Altitude: 3000 m (9842 ft) at full power performance (power limited for heights above 3000 m).

Fuse: T3AH125VAC.

Note: *The controller is recommended to be used in Pollution of Degree 2. Pollution Degree 2 applies where there is only non-conductive pollution that might temporarily become conductive due to occasional condensation (such as the office -environment).*

Dimensions:

- **Model M830B:** 43.4 mm (H) x 85.9 mm (W) x 210.3 mm (D)
  1.71" (H) x 3.38" (W) x 8.28" (D)
- **Model M830D:** 87 mm (H) × 86.2 mm (W) × 211.2 mm (D)
  3.43" (H) x 3.39" (W) x 8.31" (D)

Weight: < 1 kg (2.2 lbs).

Front Panel Display: LCD with 4 x 16 (Model M830D) or 8 x 16 (Model M830B) characters.

Indicators:

- Status (Green)
- Minor Alarm (Yellow)
- Critical / Major Alarm (Red)

Local and Remote Access Passwords: Refer to "Passwords and Privilege Levels" on page 13.

Inputs and Outputs: Connection points provided on NCU Interface Board(s) mounted in the system. Refer to your system documentation.

Factory Default Setpoints: Refer to the Configuration Drawing (C-drawing) furnished with your system for a list of factory default values.

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NetSure™ Control Unit (NCU)

User Manual, UM1M830BNA (Issue AA, August 21, 2014)

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Spec. No: 1M830BNA, 1M830DNA
Model No: M830B, M830D

Code: UM1M830BNA
Issue AA, August 21, 2014